Smart FAQ Assistant

Overview

In this tutorial, we will be creating a smart assistant that can answer user questions basing on a pdf file that is provided as input and can also can query a machine learning model for prediction.

Pre-reqisites:

1) IBM Cloud Account 2) Watson Studio 3) Watson Machine Learning service 4) Watson Discovery service 5) IBM Cloud Functions 6) Watson Assistant

Creating IBM Cloud Account:

- Create your account at cloud.ibm.com/registration
- You will get a confirmation email to the provided email address

Once we have created our IBM Cloud account and logged into it, we will be creating the next set of services as 4 discreate steps.

Step 1

Create a Machine learning model on Watson Studio using AutoAI and deploy it to Watson Machine Learning service.

Step 2

Create a collection on Watson Discovery, load documents and use smart document understanding to better process the documents.

Step 3

Create a cloud function that can talk to discovery service or watson machine learning service as per requirement.

Step 4

In this step we create a watson assistance instance and train it to respond to basic user queries.Then we integrate the above configured services into one assistant using Cloud functions.

AutoAI and WML

Quick links : Home - **Step 1** - Step 2 - Step 3 - Step 4

Overview

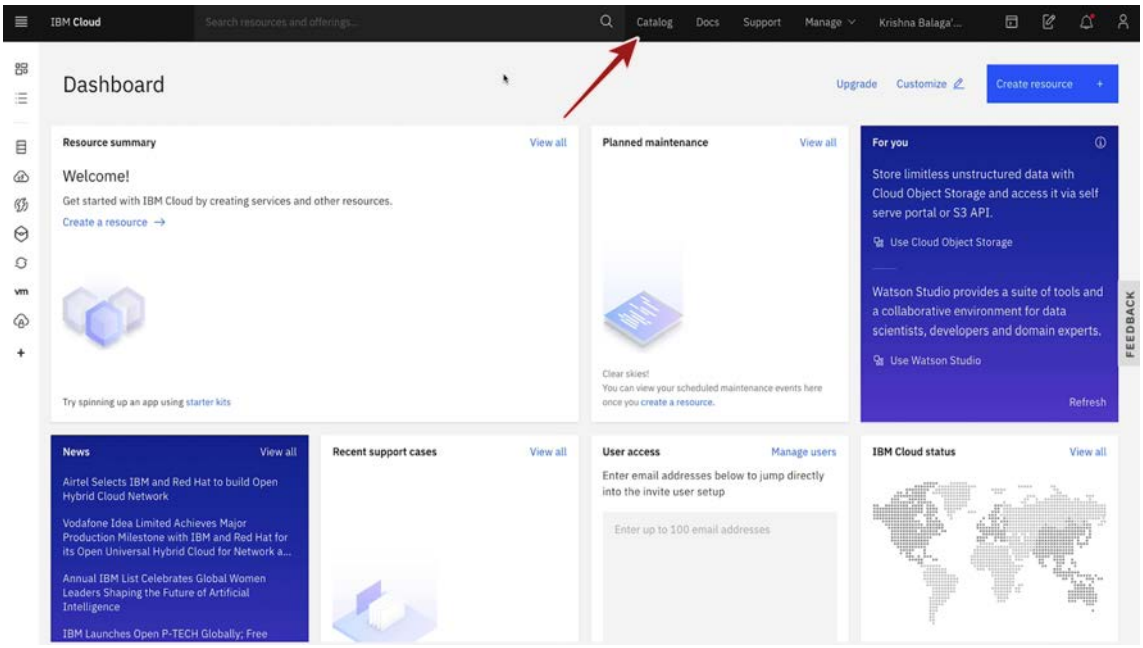
In this step, you will create a simple machine learning model using AutoAI and save the model using WML(Watson Machine Learning)

1.0) Download the project files from Github repo

```
git clone https://github.com/krishnac7/Smart-FAQ-Assistant.git
```

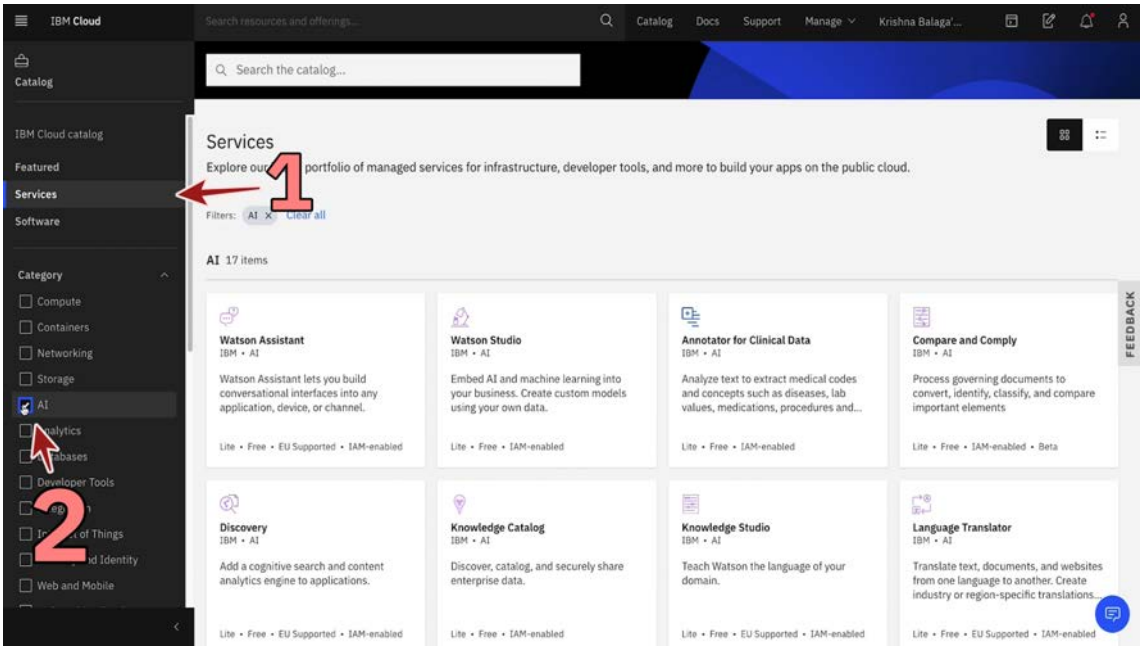
Setup an instance of Watson Studio

1.1) Click on Catalog

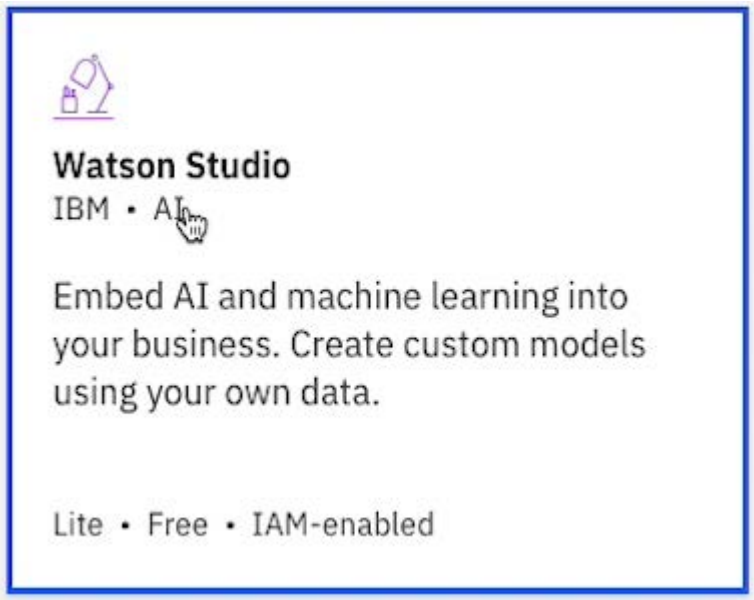


you can look at a whole list of services and offerings from ibm cloud

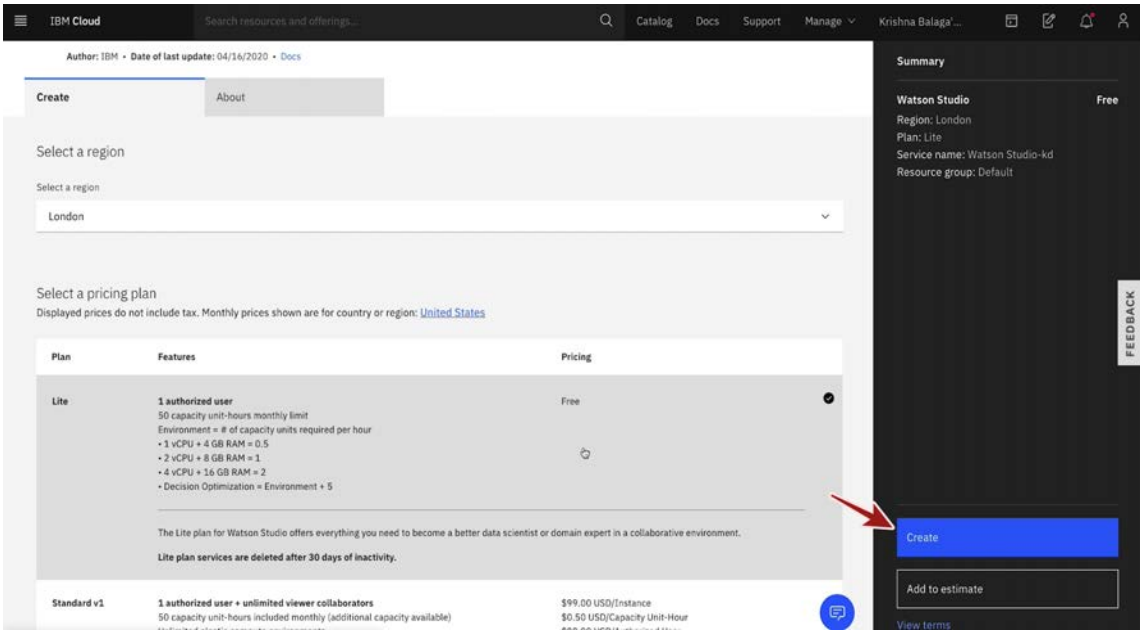
1.2) Select services tab and Filter by AI



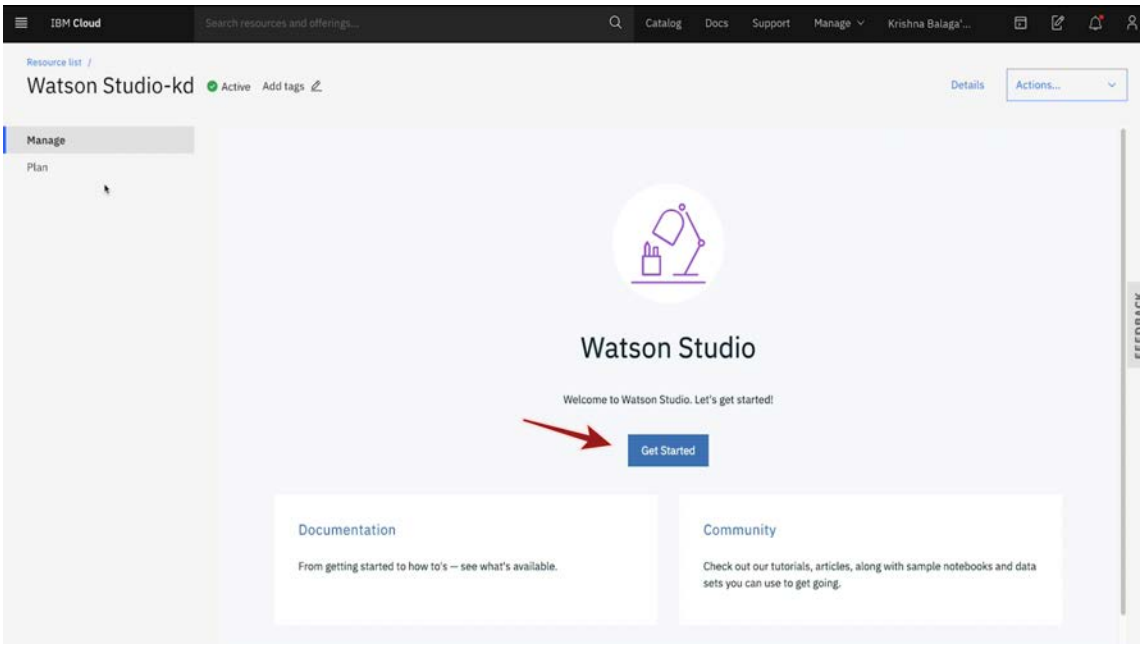
1.3) Click on Watson Studio.



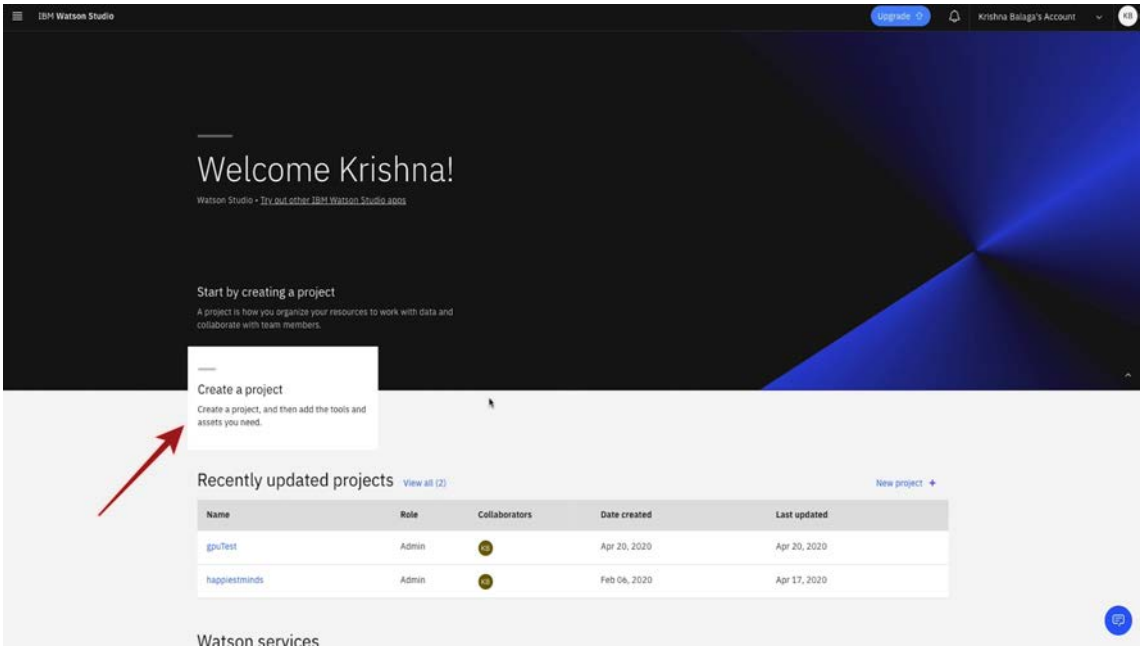
1.4) You can leave the defaults and click on Create.Do take a minute to look at features you are getting with lite plan of the service



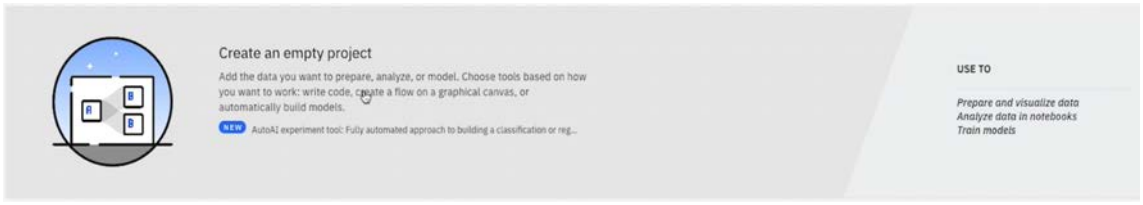
1.5) Once you click on Create, the service is provisioned. Click on Get Started.It opens a new tab with your watson studio dashboard



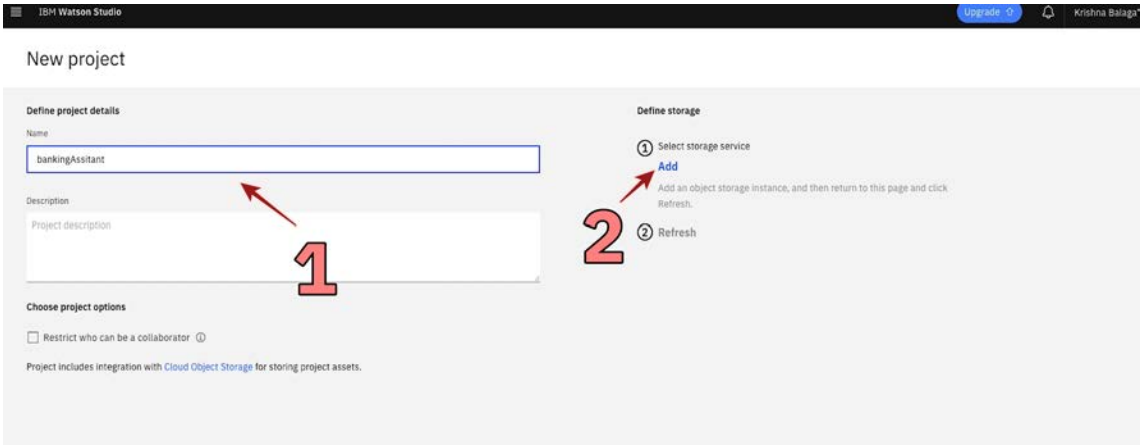
1.6) Once you are in watson studio dashboard, the first thing we will do is create a project to work in.click on create a project



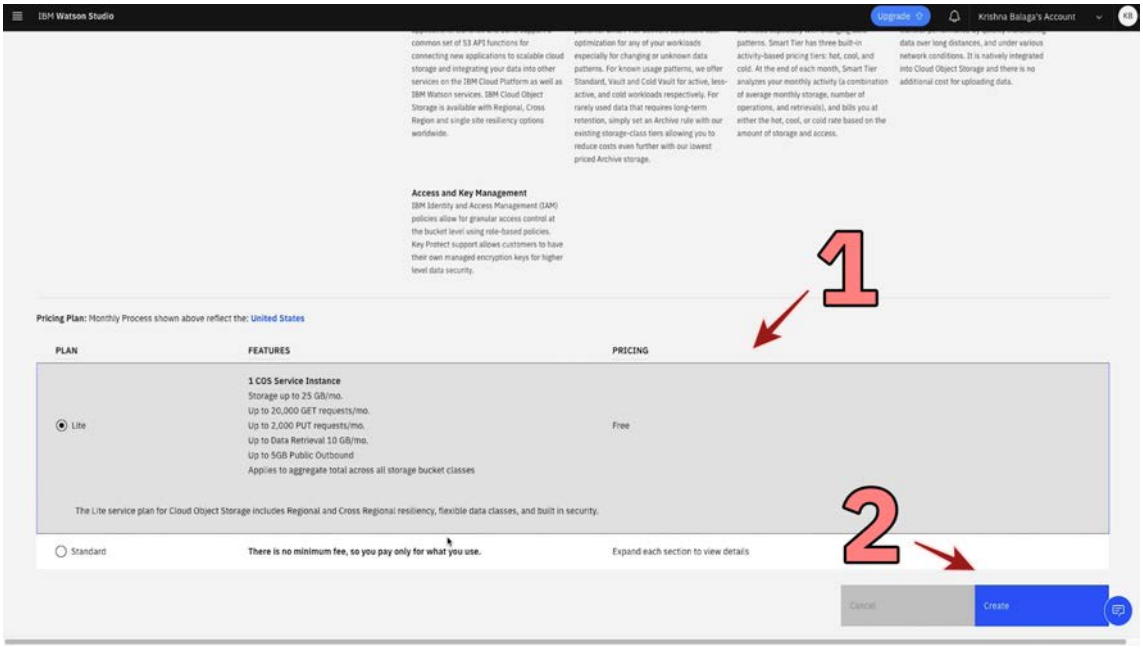
1.7) Select Create an empty project.



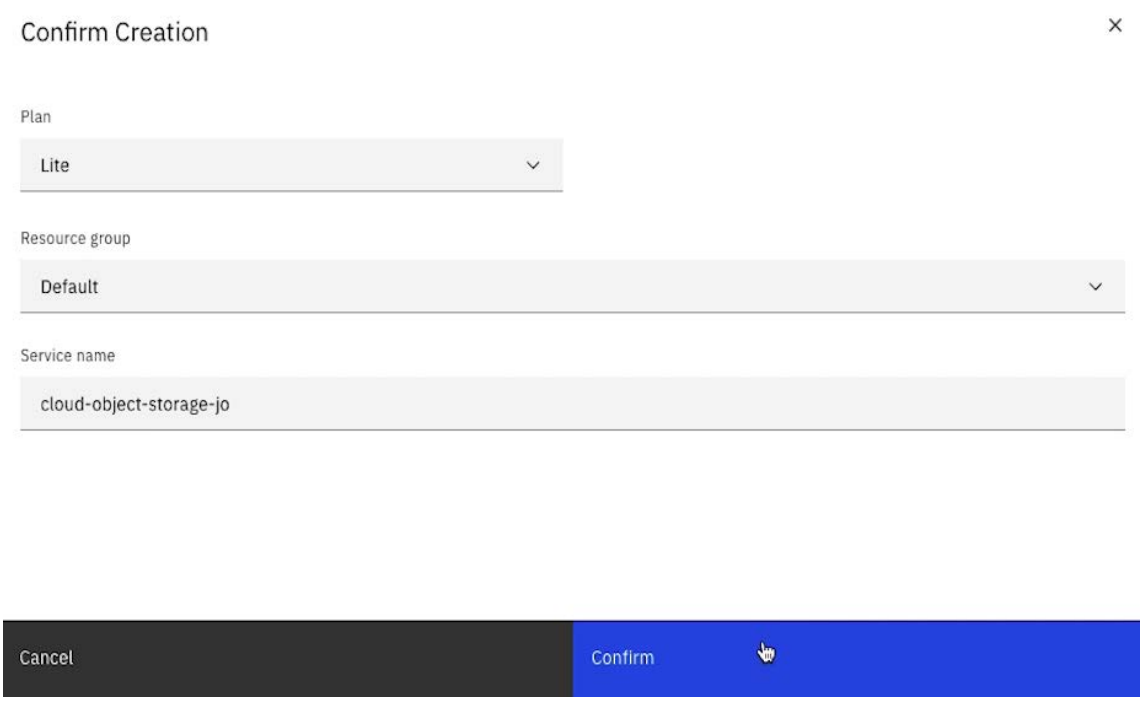
1.8) Give a Unique name to your project.and To add storage to your project, Click on Add.if you see the storage option prefilled, you can skip the next step



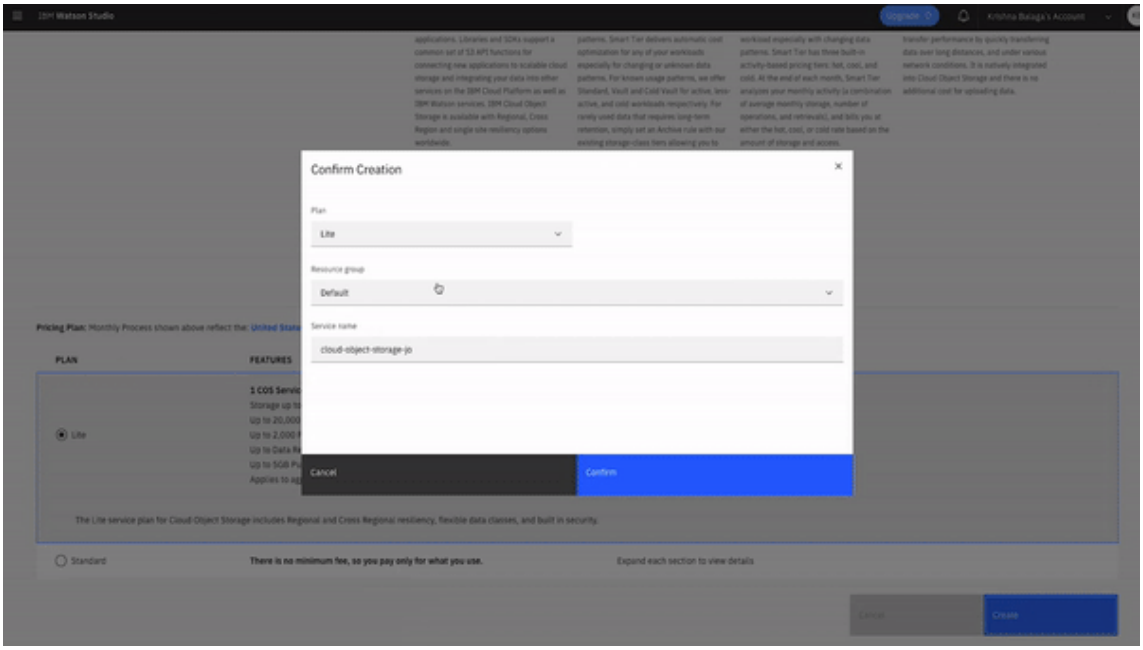
1.9) It will open a new tab where you can create a new instance of object storage. you can select the lite plan and click on create



1.10) You can leave the defaults and click on confirm.the service name generated for you can be different

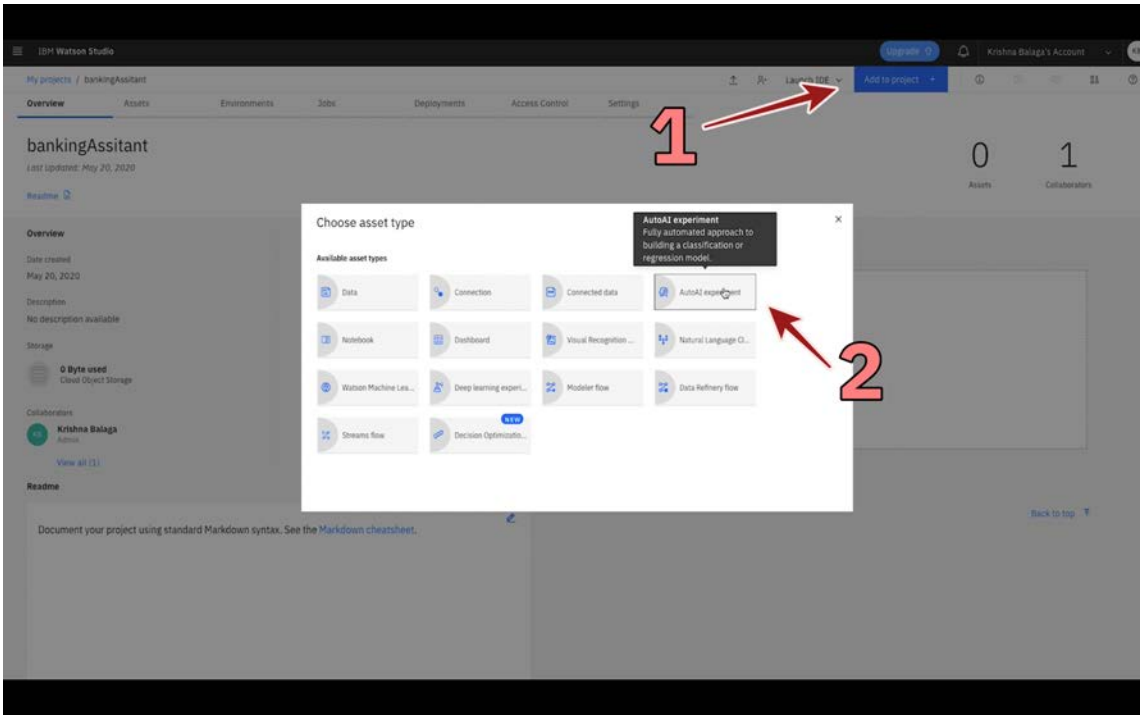


1.11) Once the Object storage is created, you can close the tab and press refresh to see your attached storage

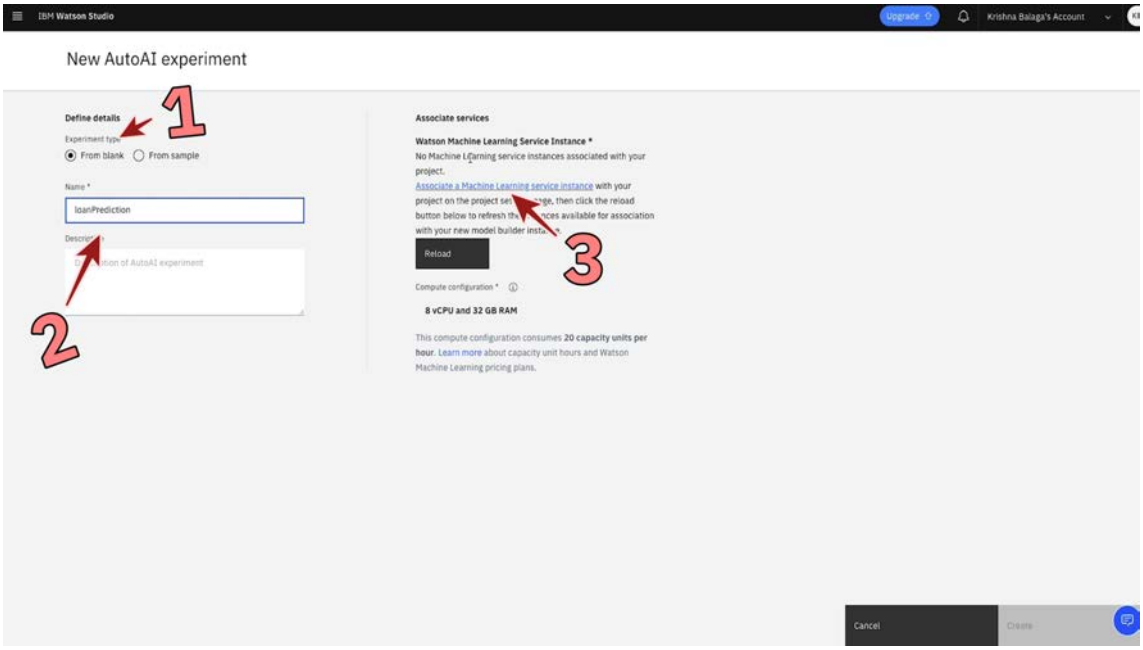


Run and Auto-AI Experiment

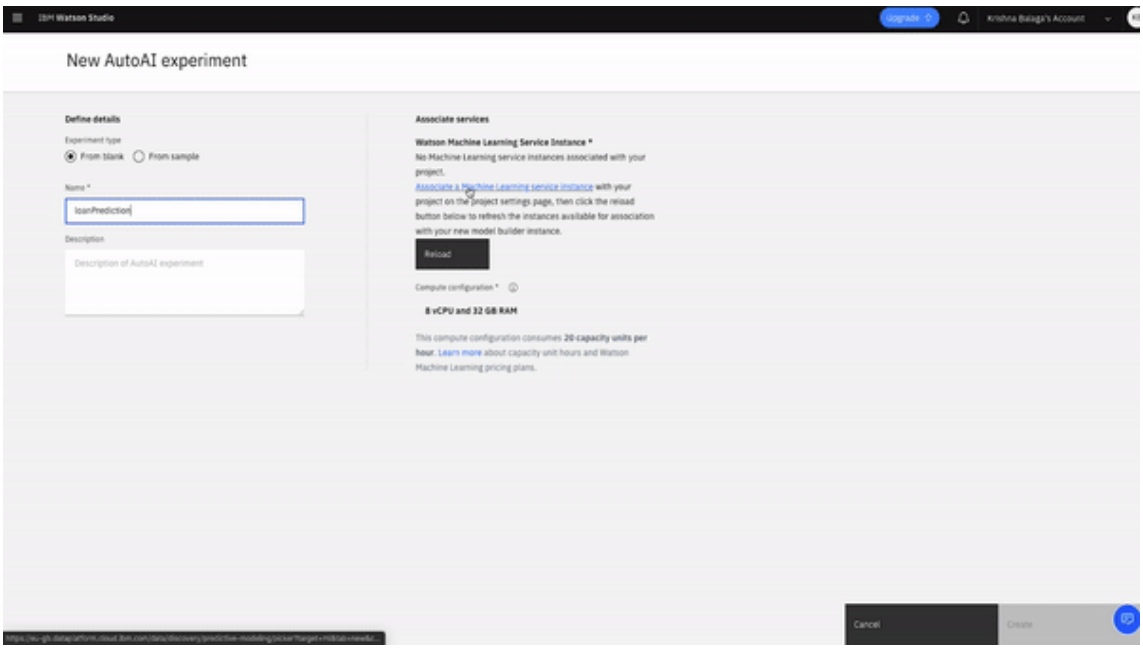
1.12) Within project, click on 'Add to project' and choose AutoAI Experiment.



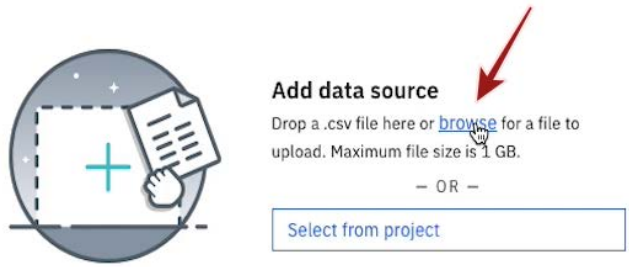
1.13) Choose From blank and Provide a name for your experiment. then click on the 'Associate a machine learning service instance' url



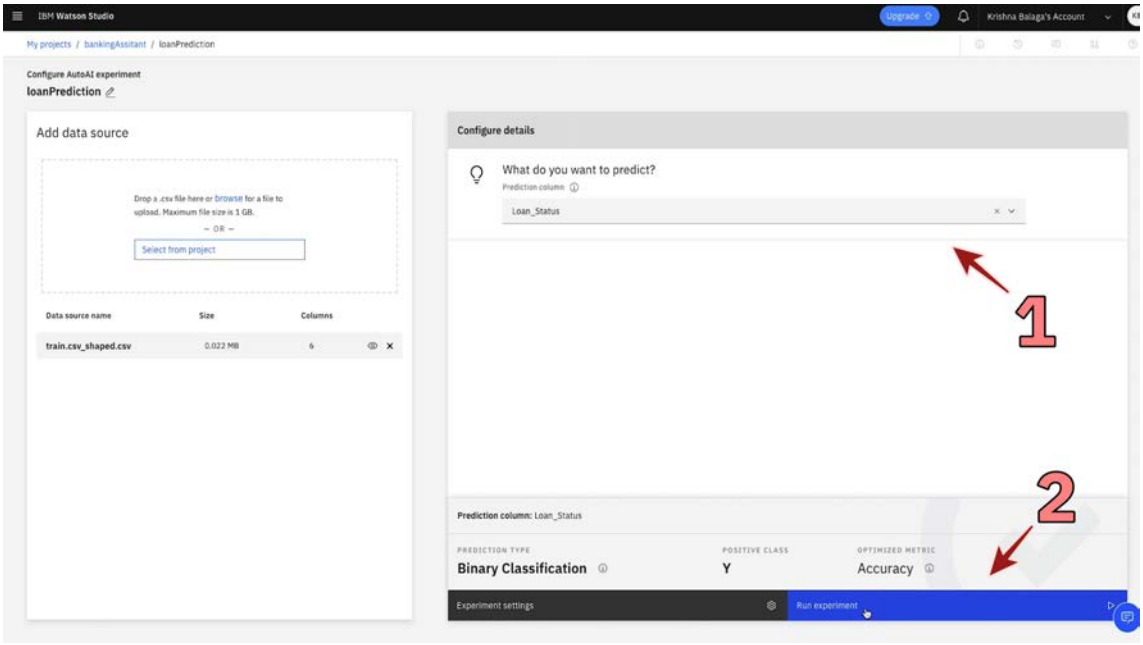
1.14) Select a lite instance and click confirm then create the service.Once the service is created go back to the Auto AI Tab and click on Reload.



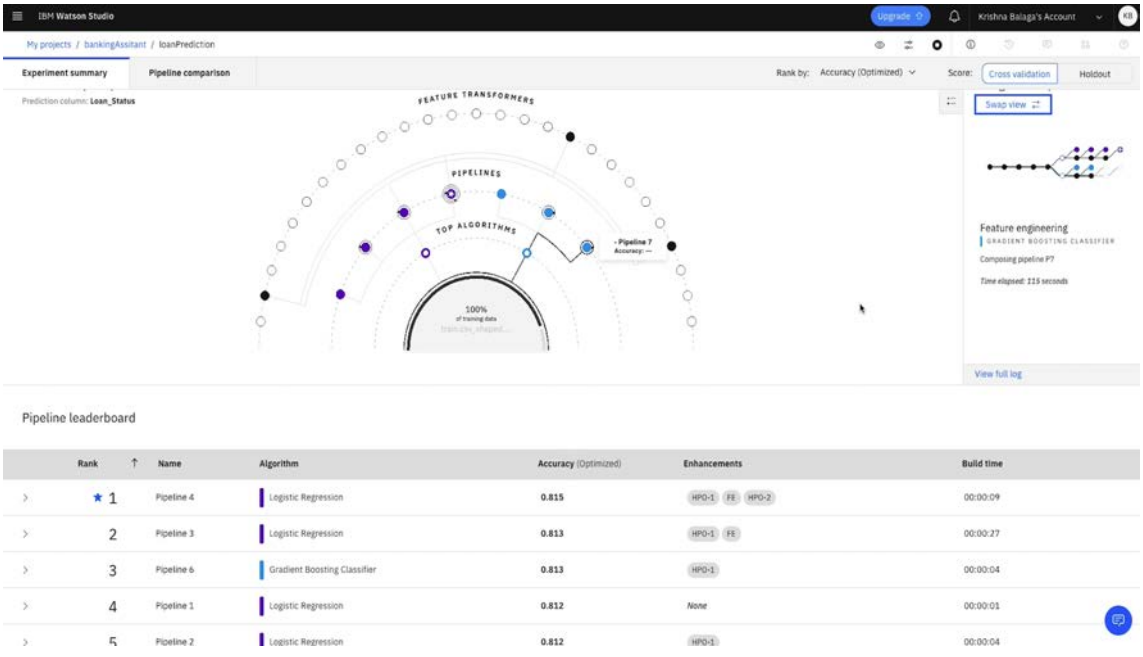
1.15) Click on create and in the next page click pn browse and upload 'train.csv_shaped.csv' or you can also drag and drop the same file on the upload area



1.16) Select the predict column to be 'loan status' and click on 'Run Experiment'

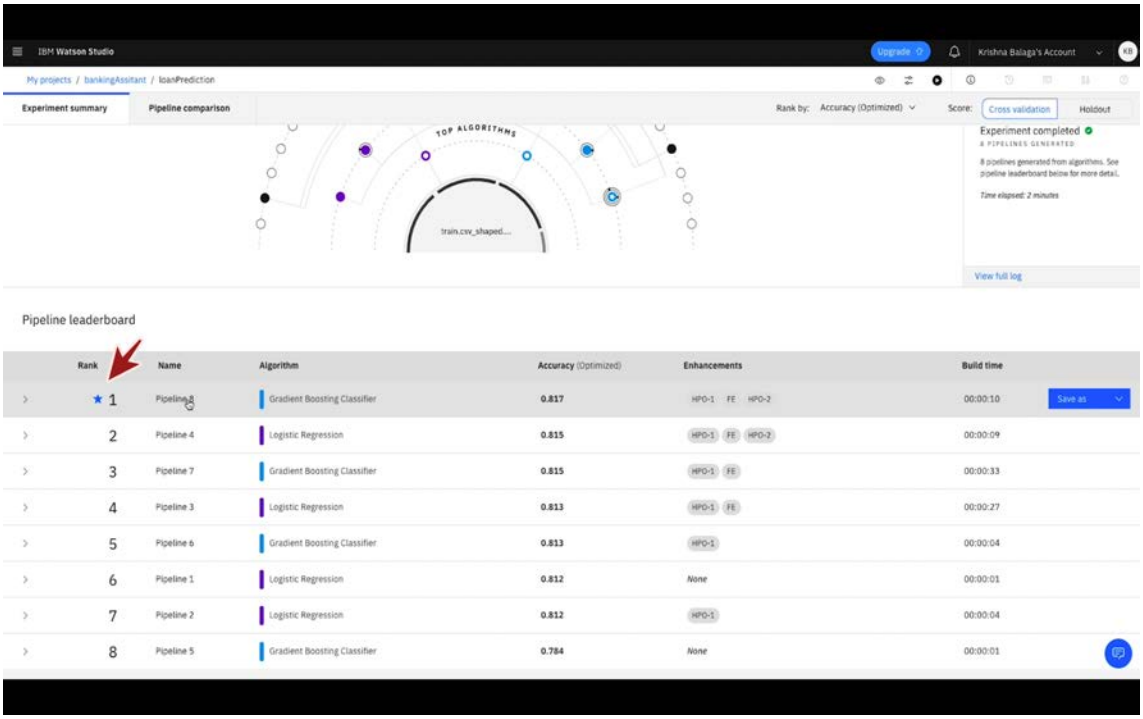


1.17) Then the AutoAI experiment starts running. AutoAI will create multiple pipelines.



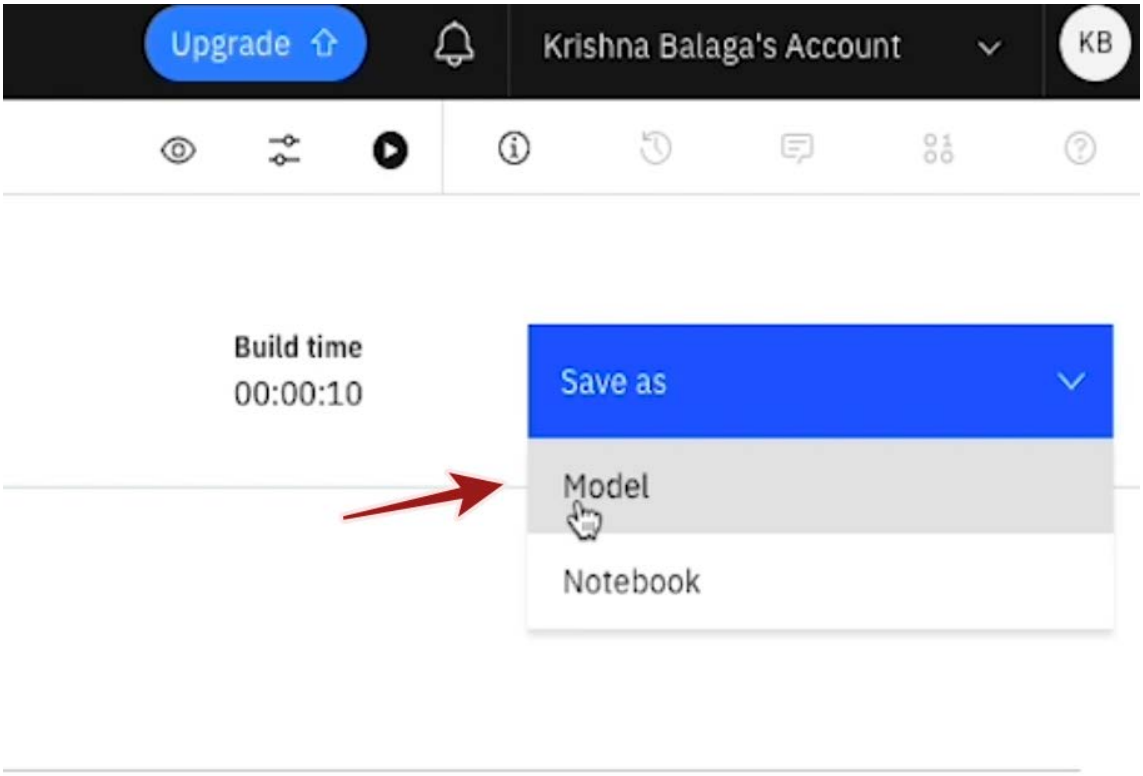
to further understand how AutoAi works, please refer the [documentation]

1.18) Once the process is completed, the pipelines are sorted according to the optimization metric and the most efficient pipeline is marked with a star next to it.

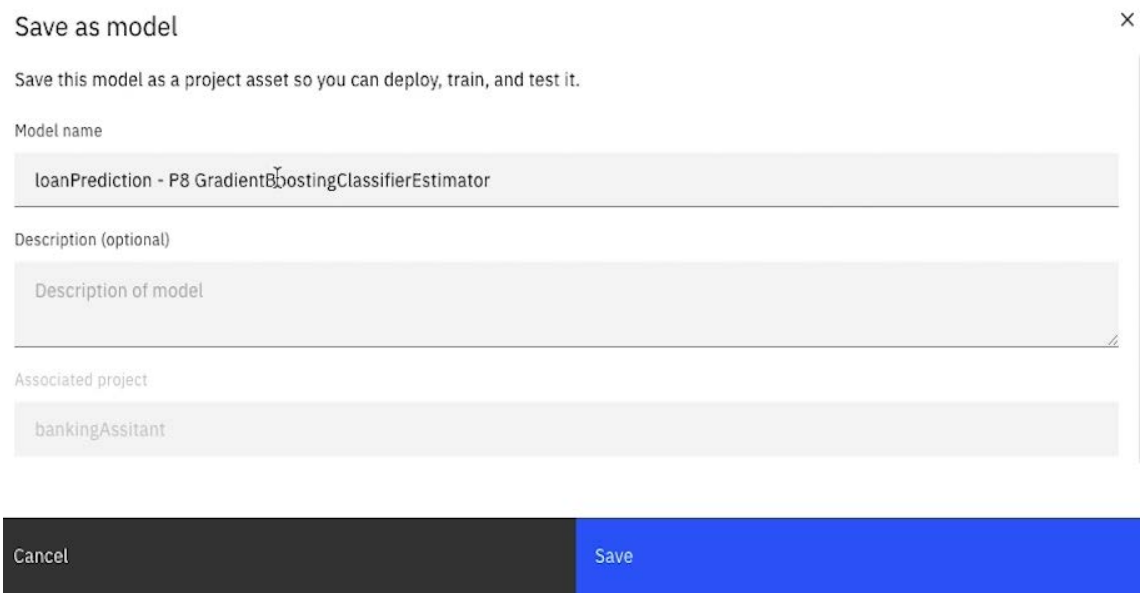


Save the model and create a deployment

1.19) You can explore the pipeline information by clicking on its name. To save this model, from the right top corner click on Save as and choose model.

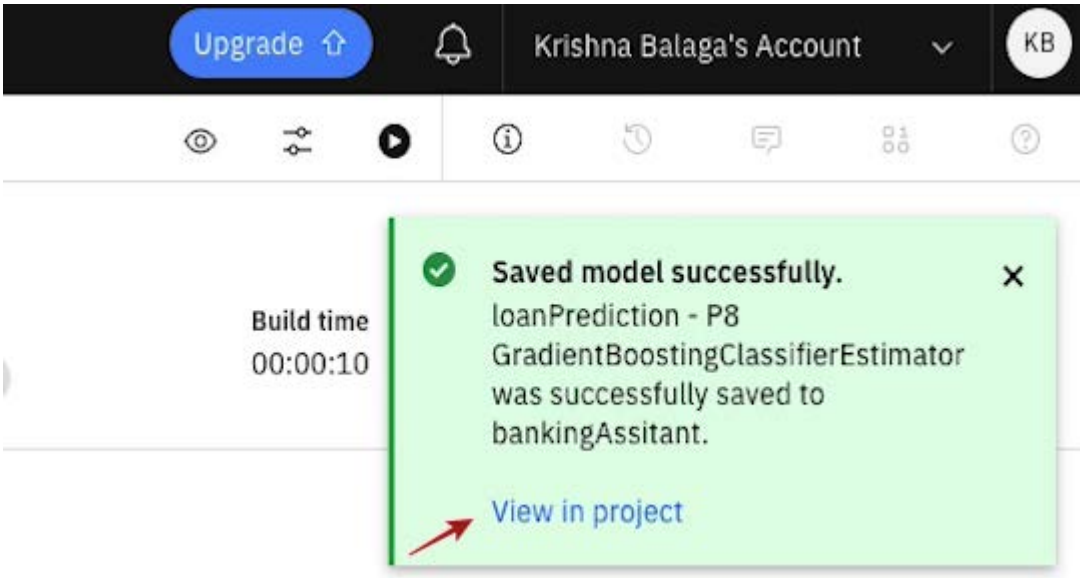


1.20) You can leave the model details as default and click on save

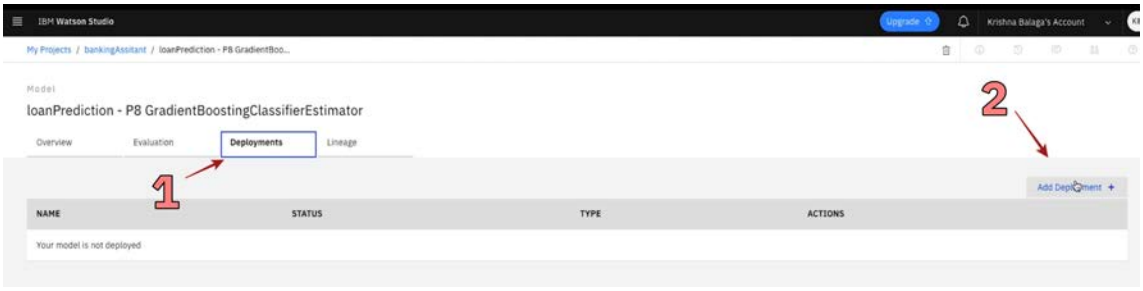


Note: the name generated depends on the algorithm used, sometimes it can be different from what is showed in the illustrations

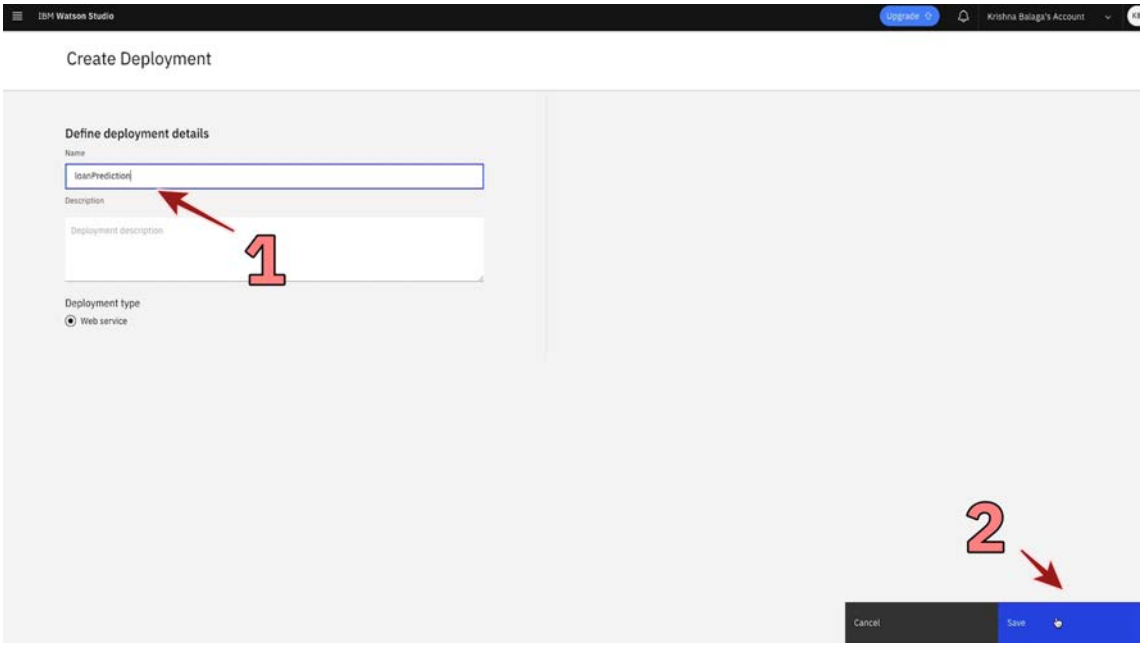
1.21) Once the model is saved, click on View in project from the pop-up notification to open the saved model.You can always find it listed in assets tab of your project



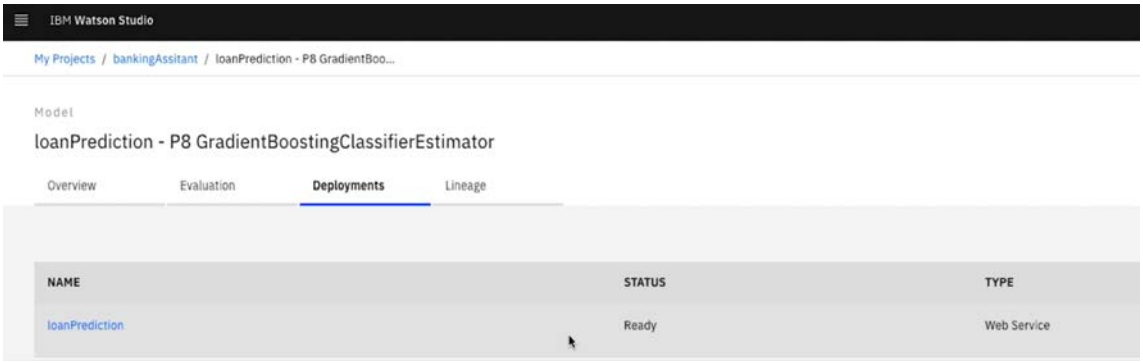
1.22) Once the saved model is opened,navigate to deployments tab and click on click on Add Deployment.



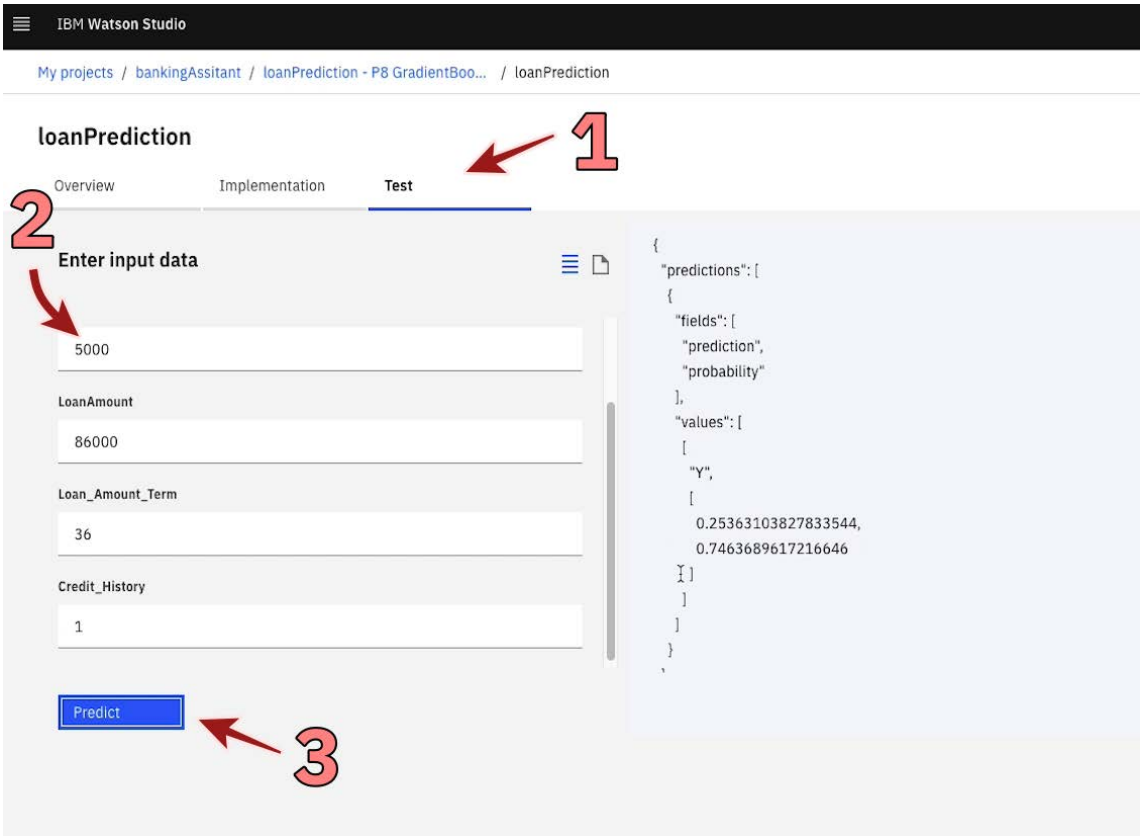
1.23) Provide a name and click on Save.



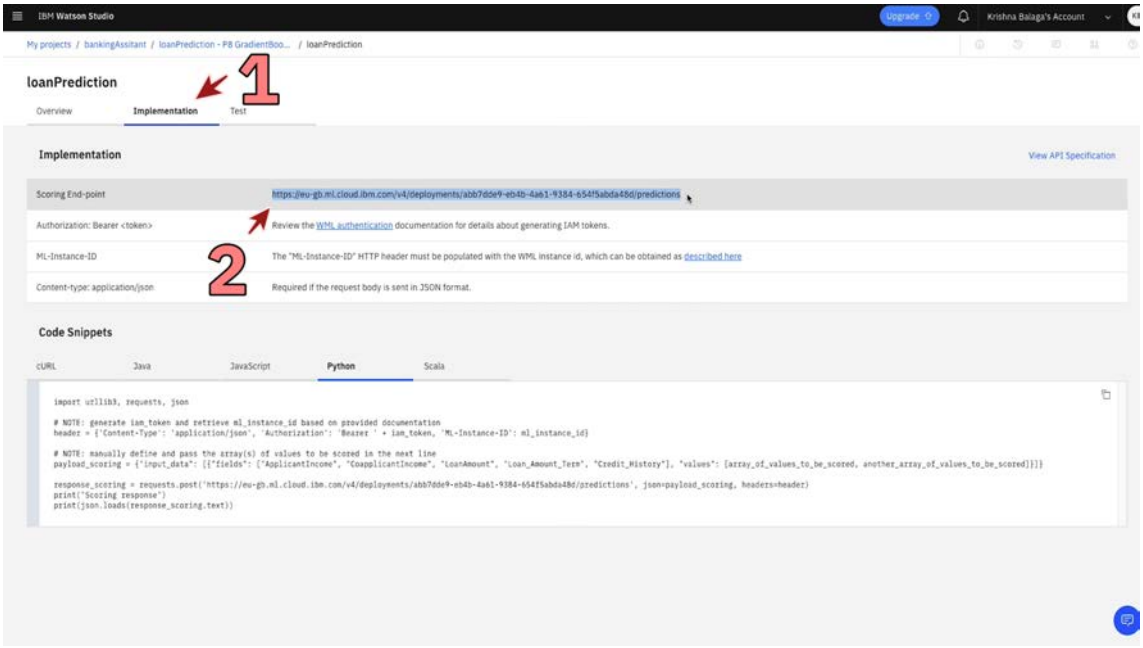
1.24) Wait for deployment status to change to Ready and click on the created deployment.



1.25) In the deployment,navigate to Test tab and input the details and click on Predict to get the predictions from the saved model

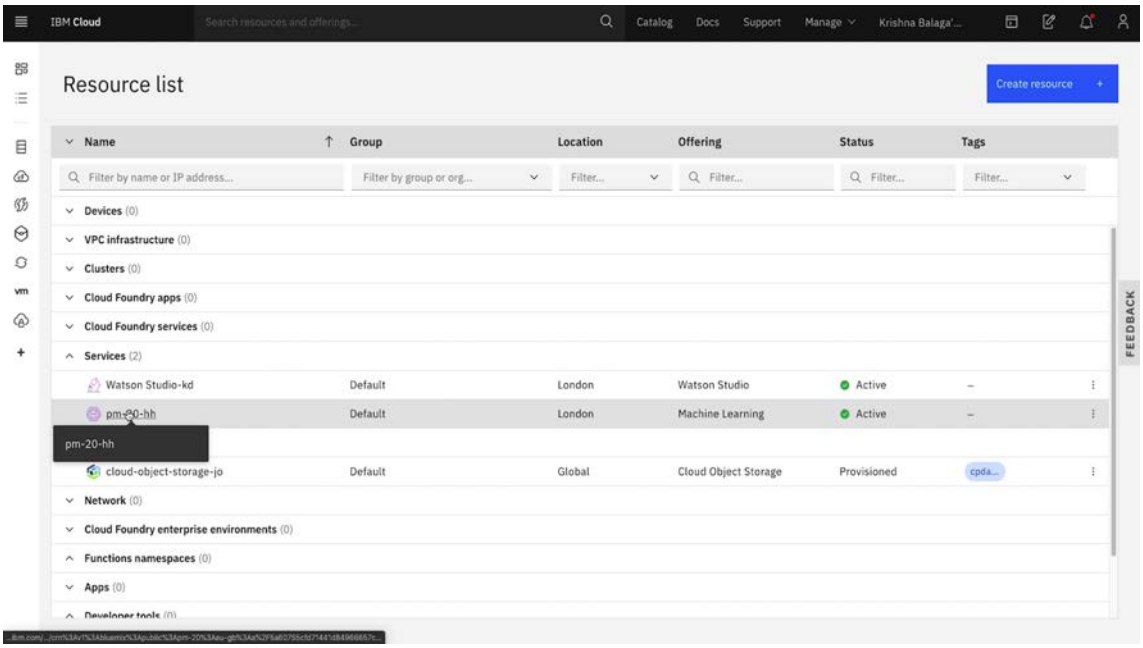


1.26) Now that the model is deployed and you have tested it out, you can switch to the implementation tab and copy the scoring End-Point url

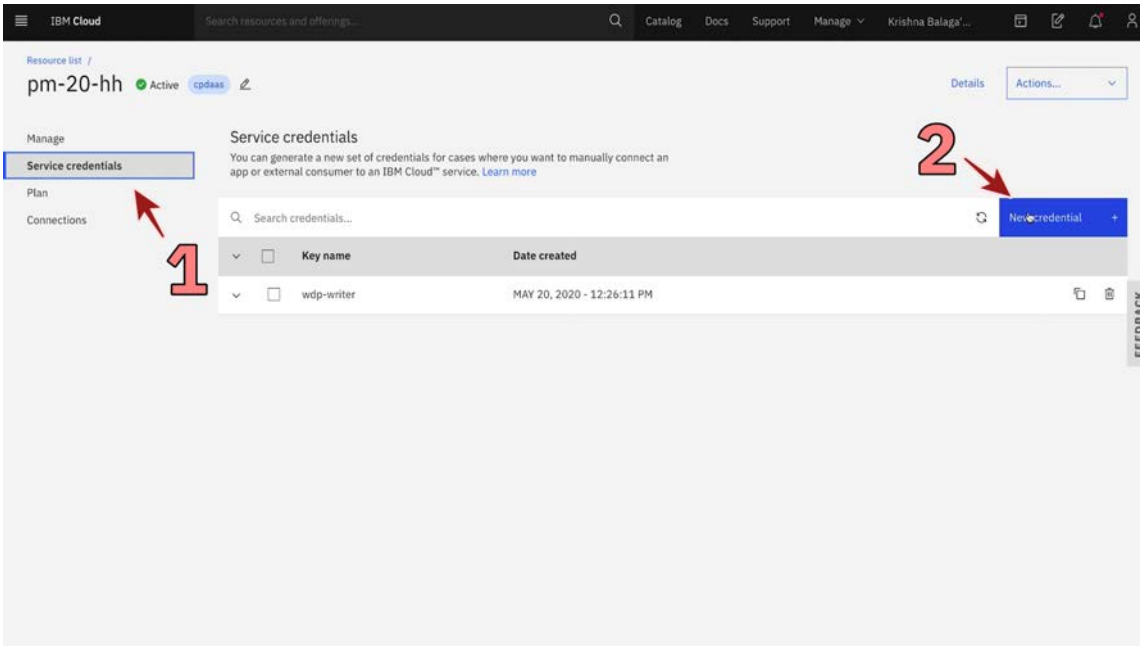


1.27) We would need a couple of more credentials to access the model, to get them navigate to your [resources dashboard on IBM Cloud]

1.28) Under services, choose your Machine learning service

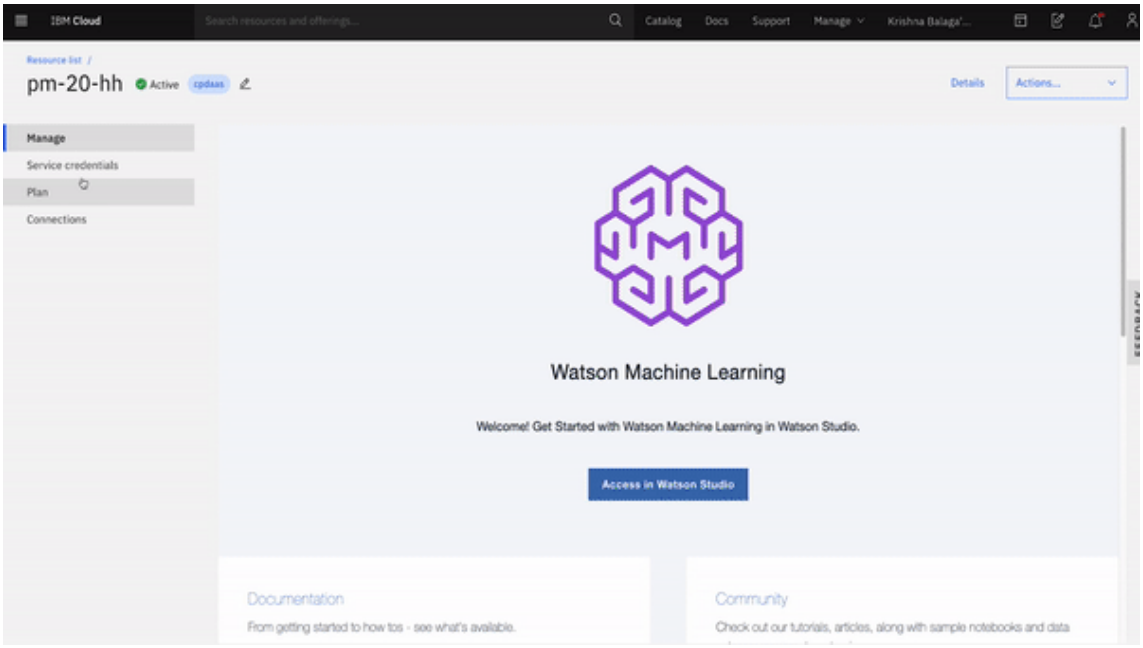


1.29) Navigate to the Service Credentials tab and then create a new set of credentials



1.30) You can leave the defaults and click on add, once the new set of credentials are added, you will need to copy

```
"apikey":"<Your WML API key>"
"instance_id":"<your WML Instance Id>"
```



we suggest maintaining a single note where you copy all the required credentials as we move forward.

1.31) Now proceed to Step 2

Watson Discovery

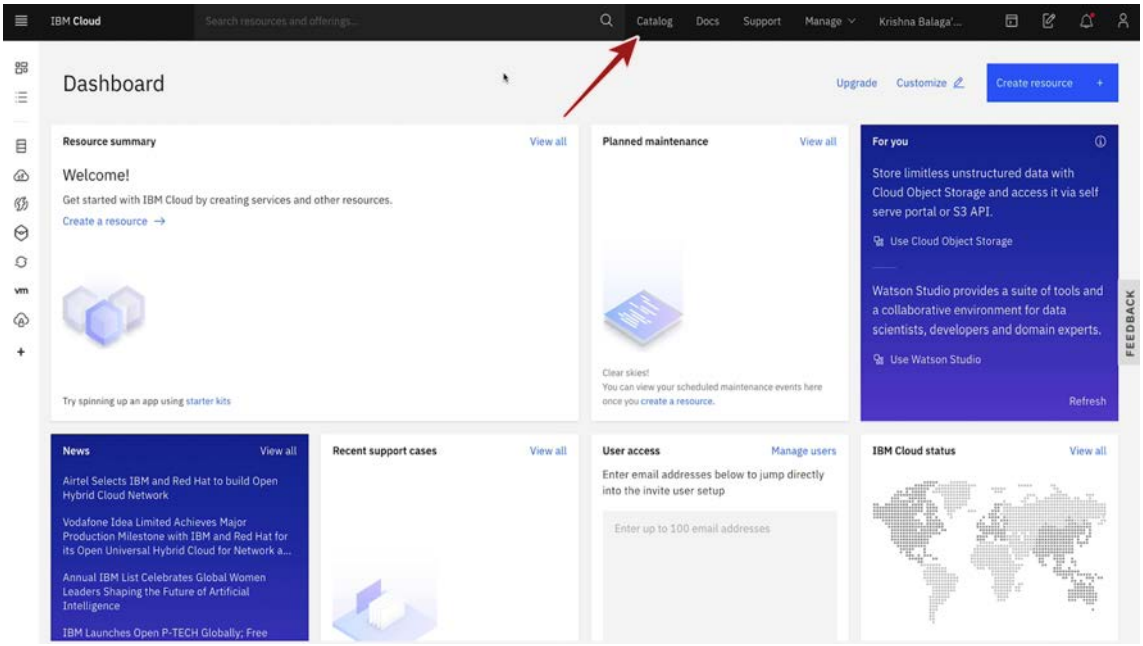
Quick links : Home - Step 1 - **Step 2** - Step 3 - Step 4

Overview

In this, you will provision an instance of Watson Discovery and use Smart Document Understanding feature to analyse the contents to create a Query able knowledge base

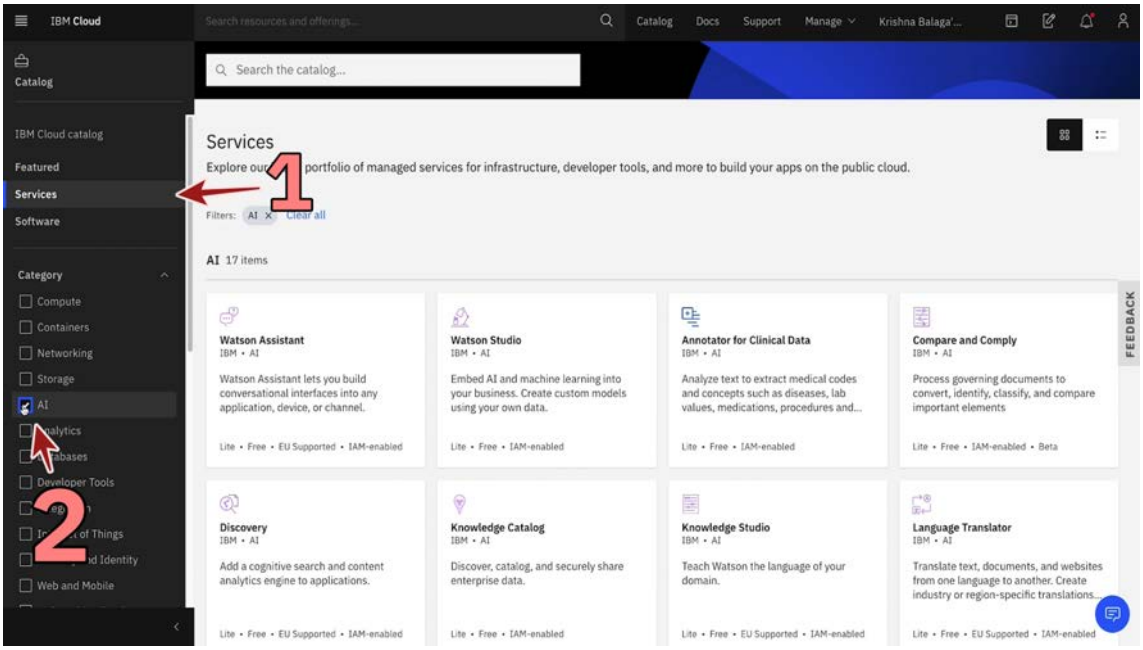
2.1) Navigate to IBM Cloud Dashboard

2.2) Click on Catalog

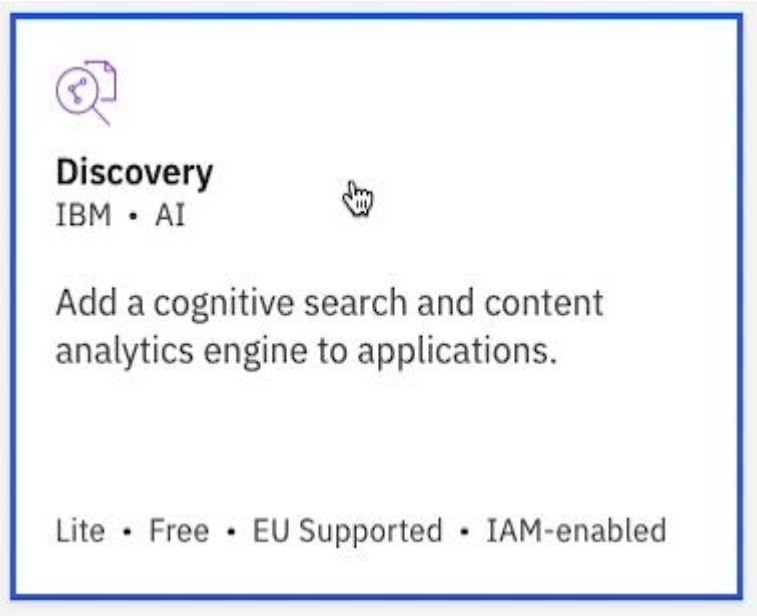


you can look at a whole list of services and offerings from ibm cloud

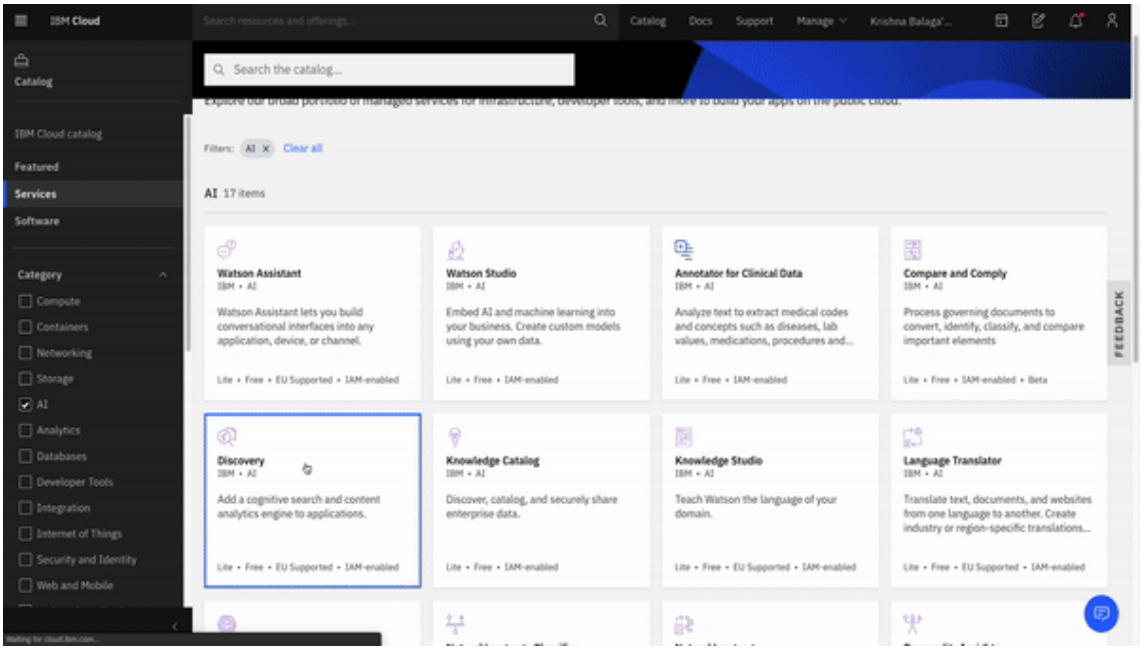
2.3) Select services tab and Filter by AI



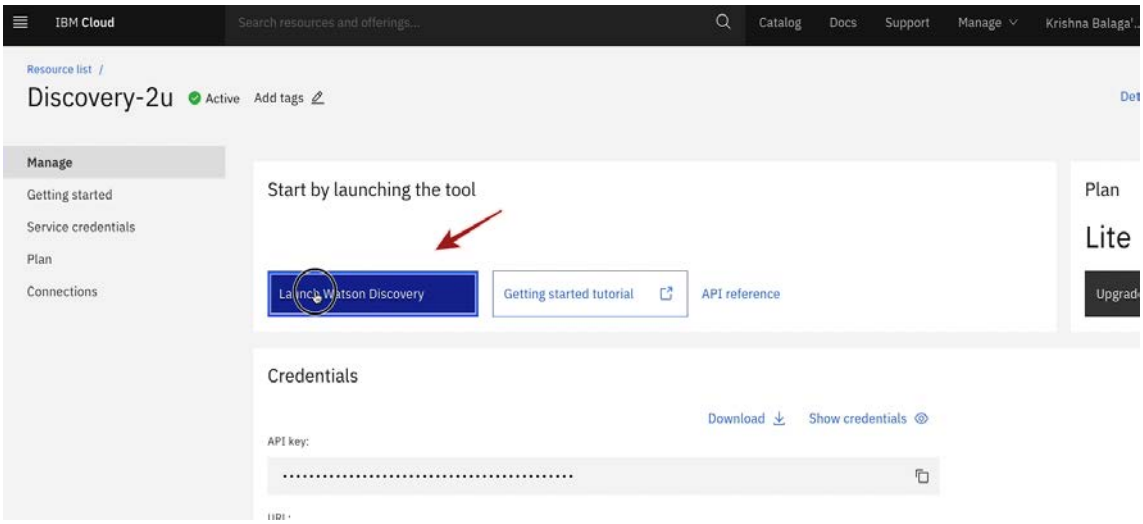
2.4 Click on Discovery service



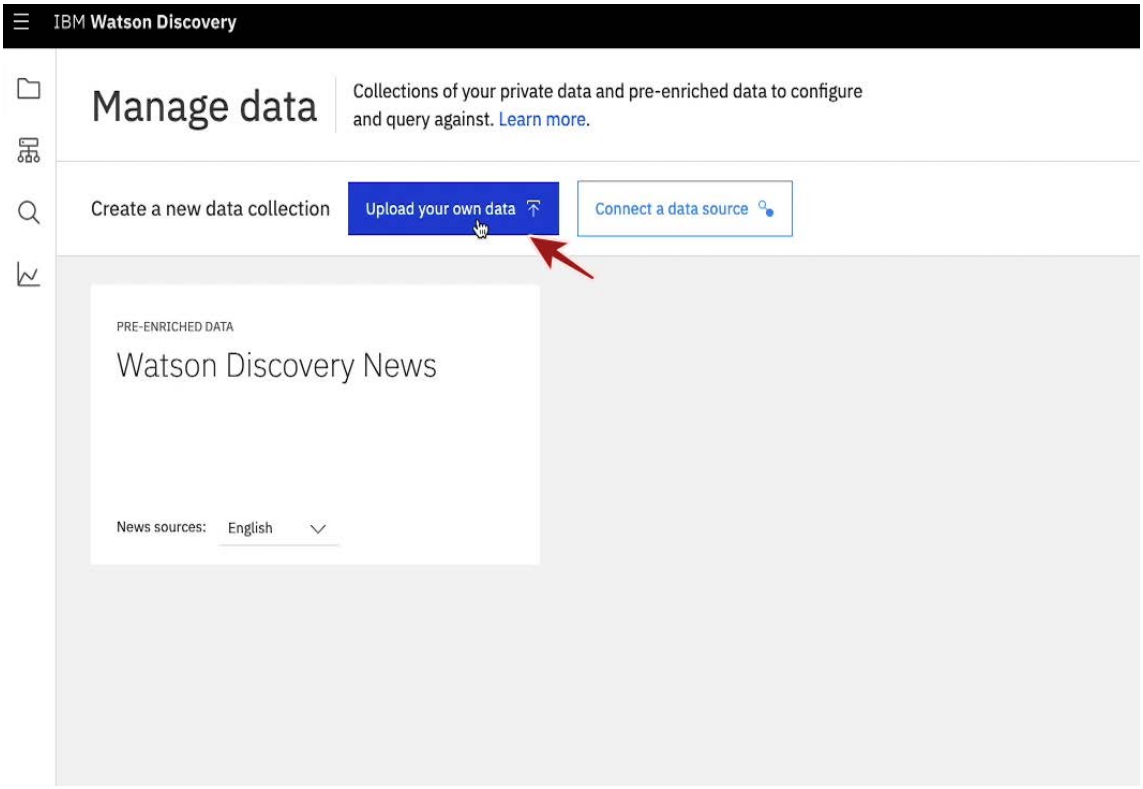
2.5) You can leave the defaults and go ahead to 'create'. wait for the provision to complete and then open the service dashboard



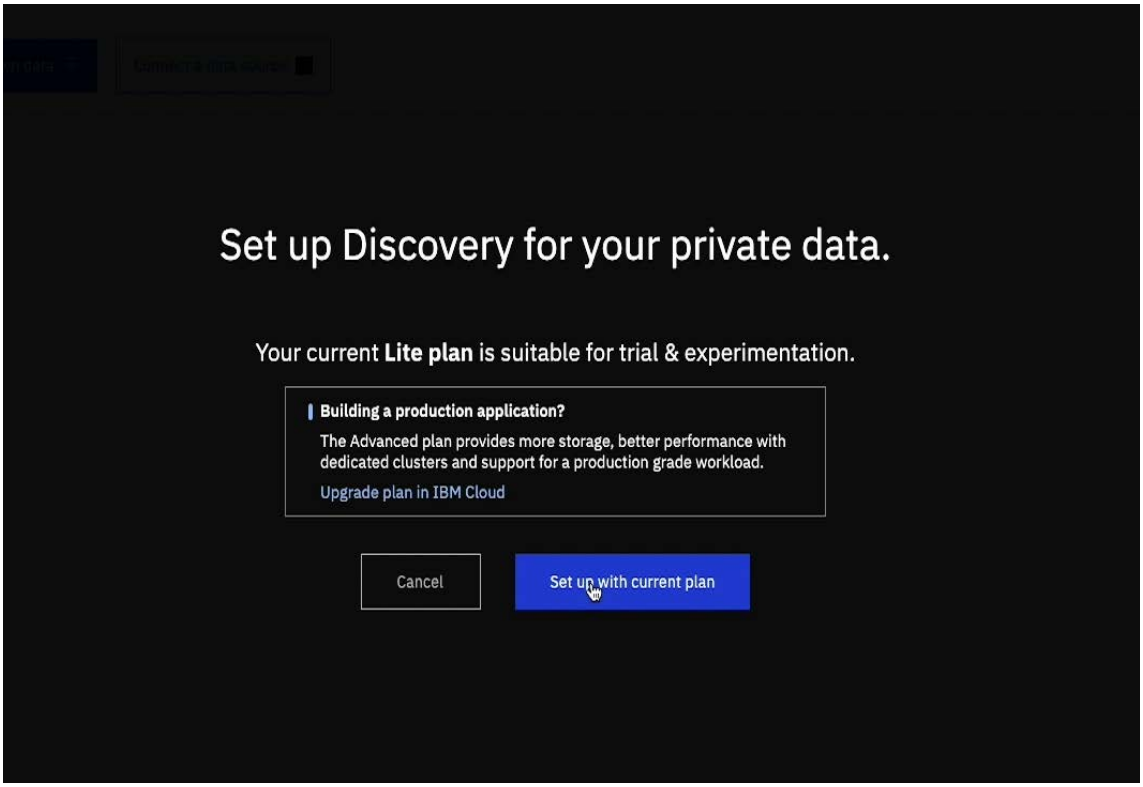
2.6) Click on 'Launch Watson Discovery' to get started



2.7) Once in Watson Discovery, click on 'Upload your own Data'

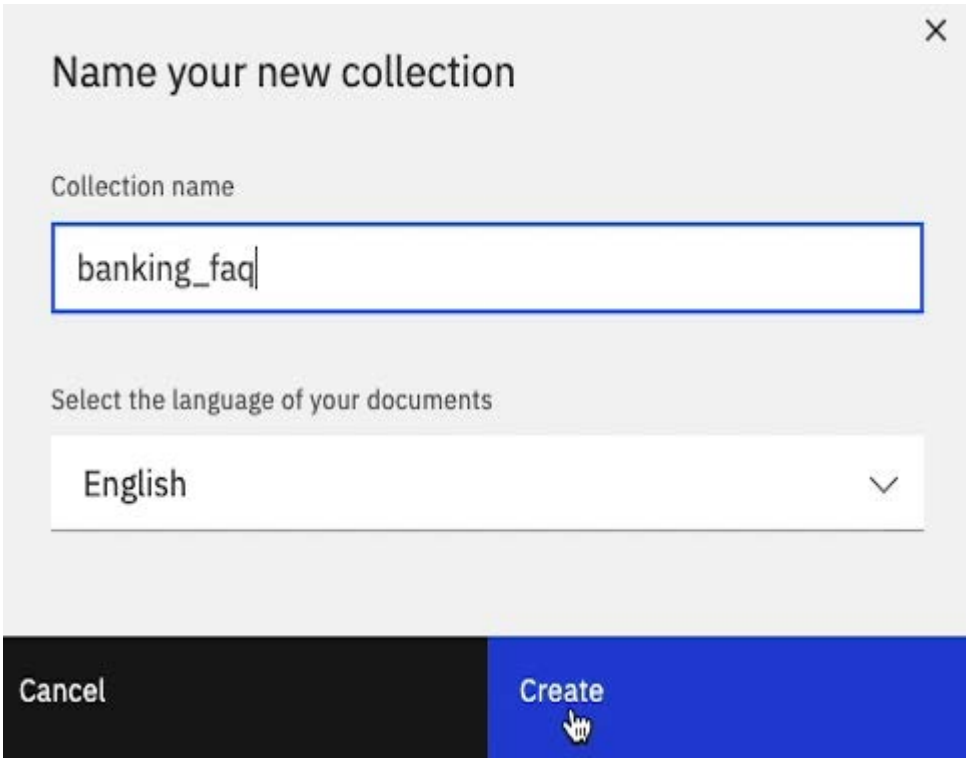


2.8) When asked for storage options, choose 'Setup with current plan'



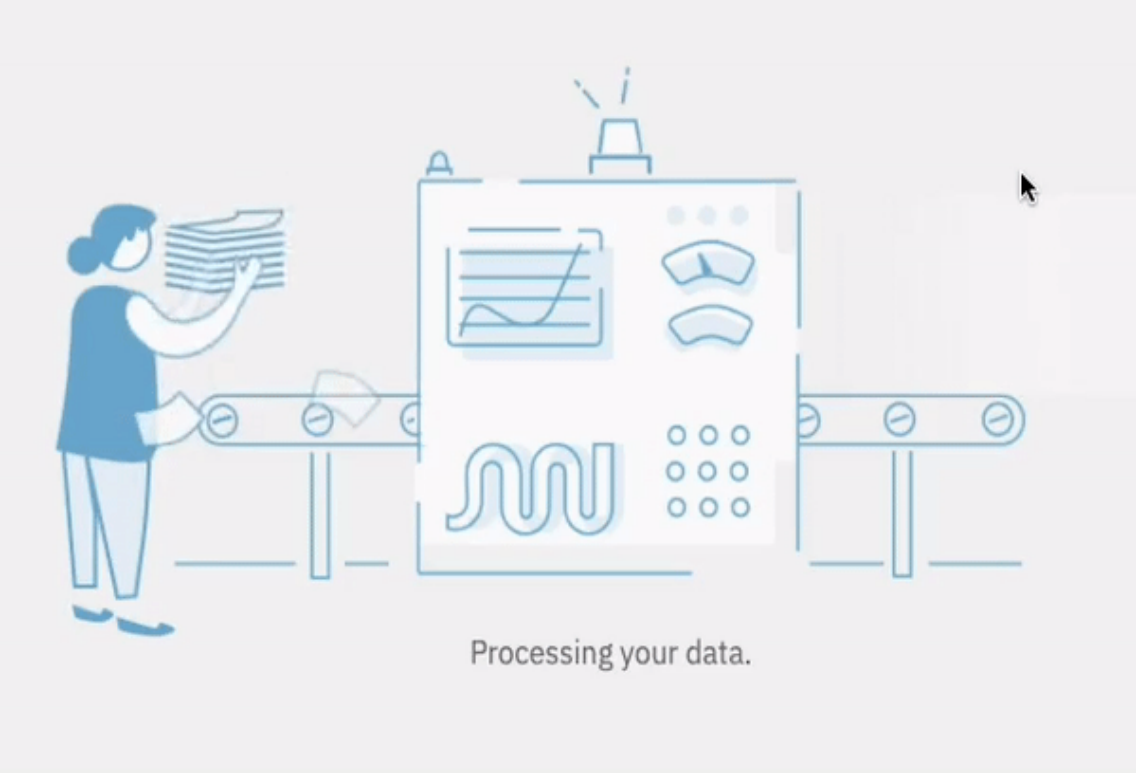
2.9) Once the storage setup is complete, click on 'Continue'

2.10) When a prompt for naming your collection comes in, give the collection a name and click on create

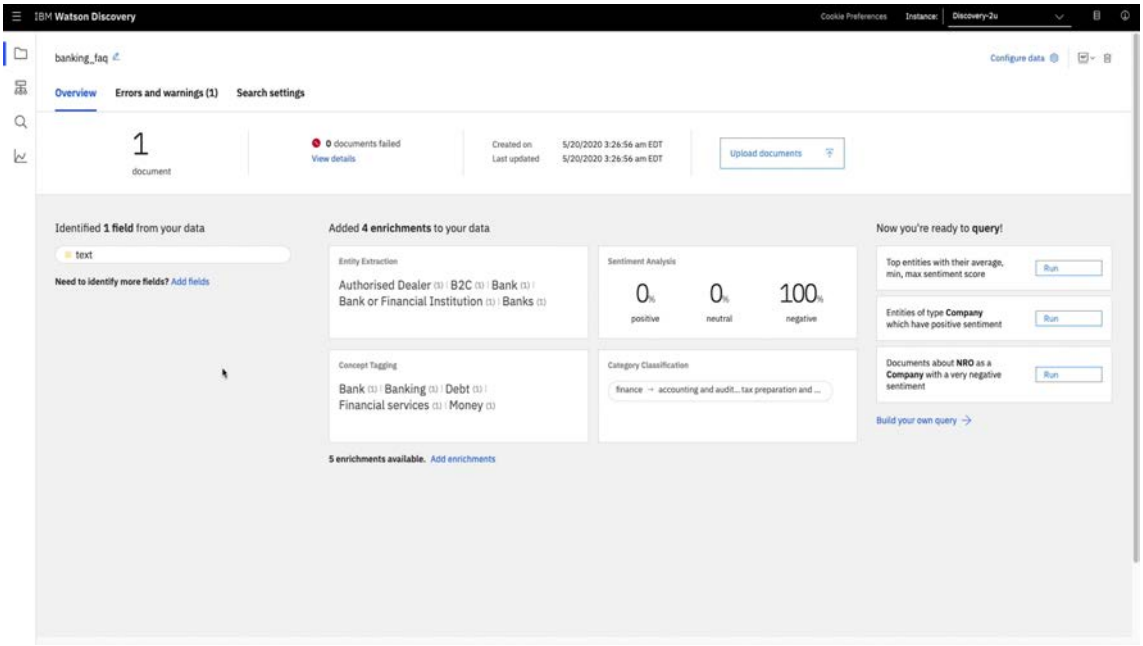


2.11) Once the collection is open, you can click on 'Upload documents' and select the faq_banking.pdf file or Drag and drop it.

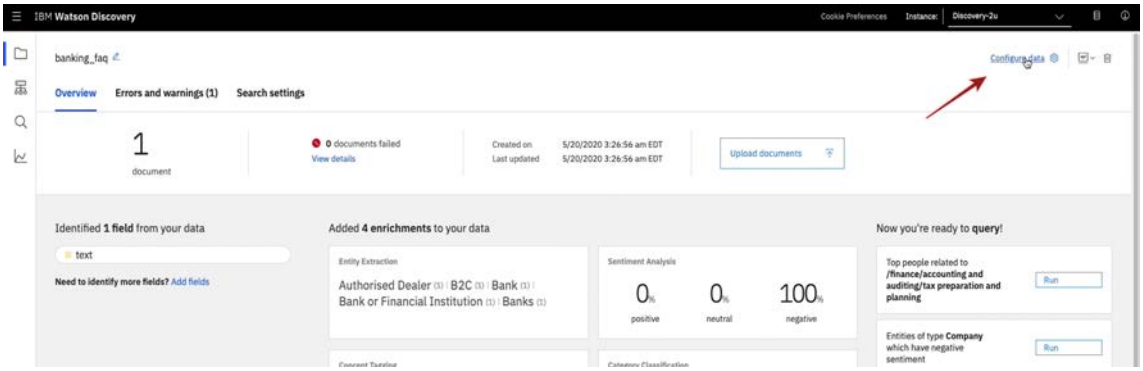
2.12) It might take a little while for initial processing of the document



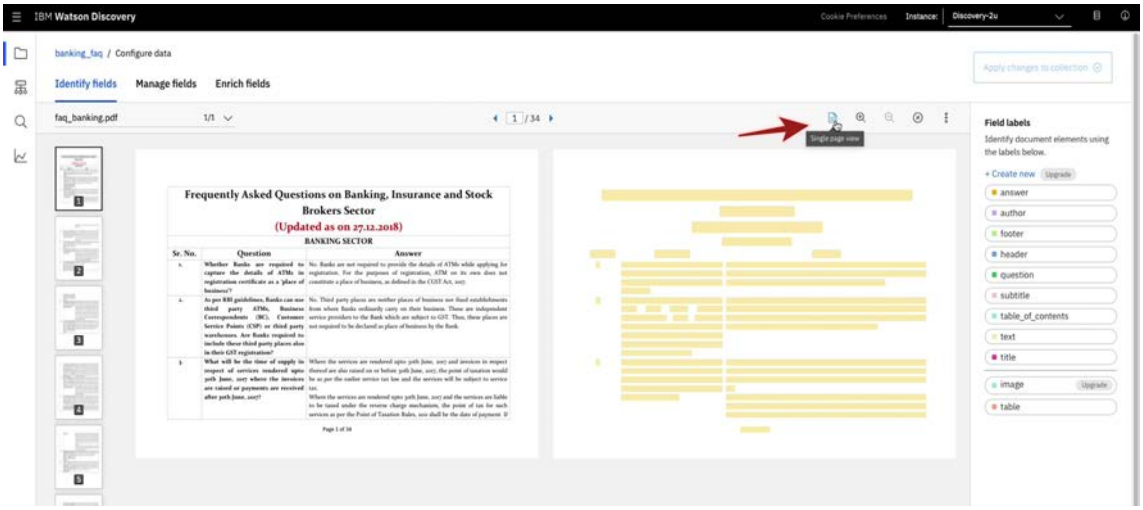
2.13) Once the processing is done, you would see some basic enrichments generated from the document



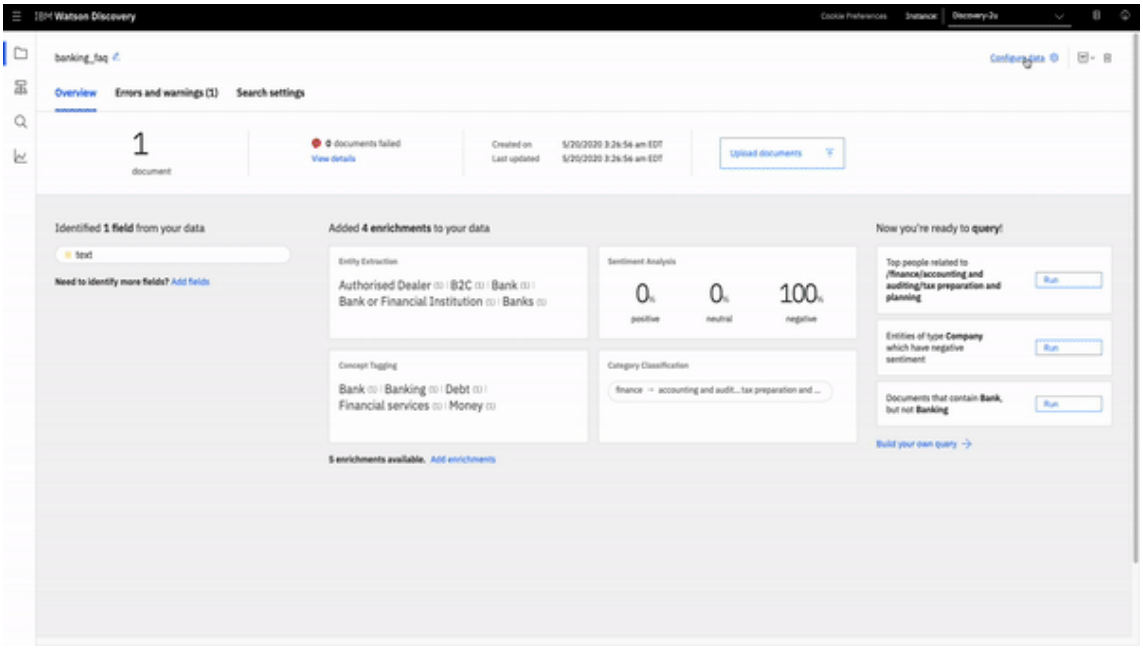
2.14) Now click on 'Configure Data' to bring up the Smart Document Understanding tool



2.15) Once you are in SDU, you will see an overview of your Document.Switch to single page View

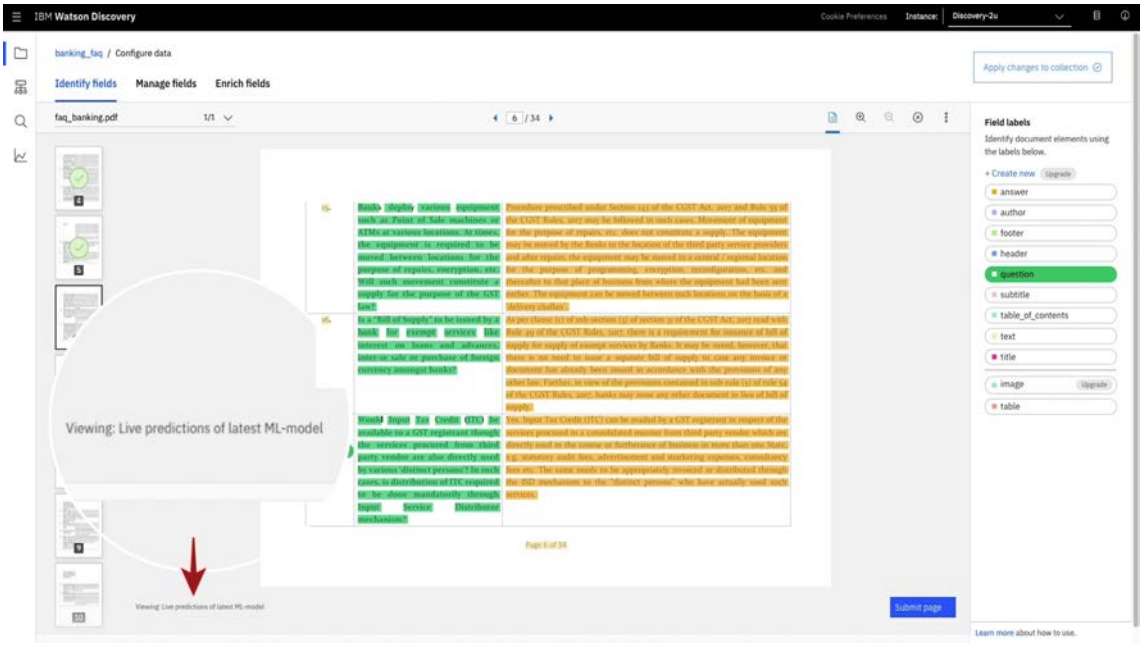


2.16) You can click on the 'question' label and start marking the questions column.Do the same for 'answer' label

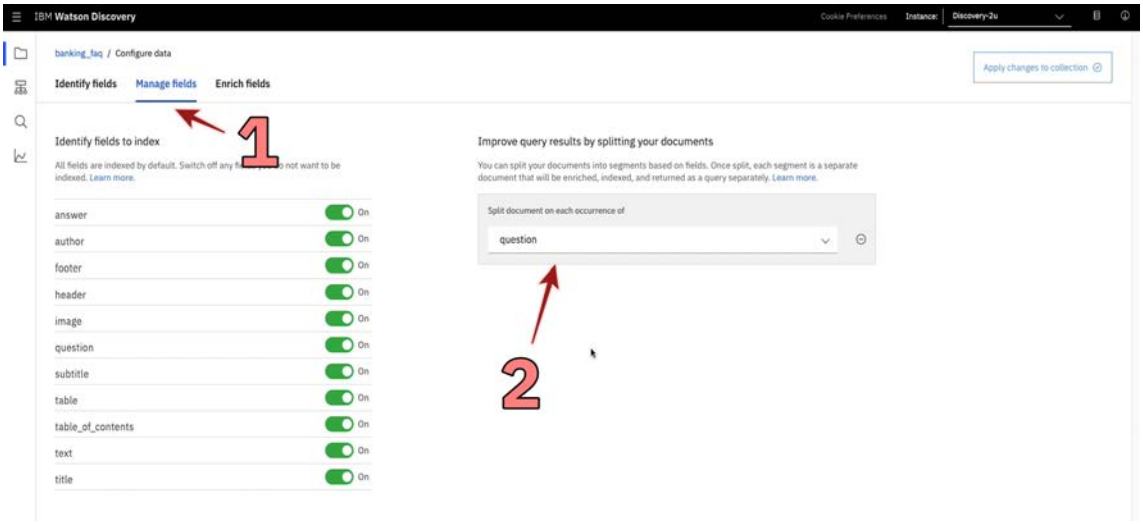


2.17) Once you are happy with the marking, click on submit

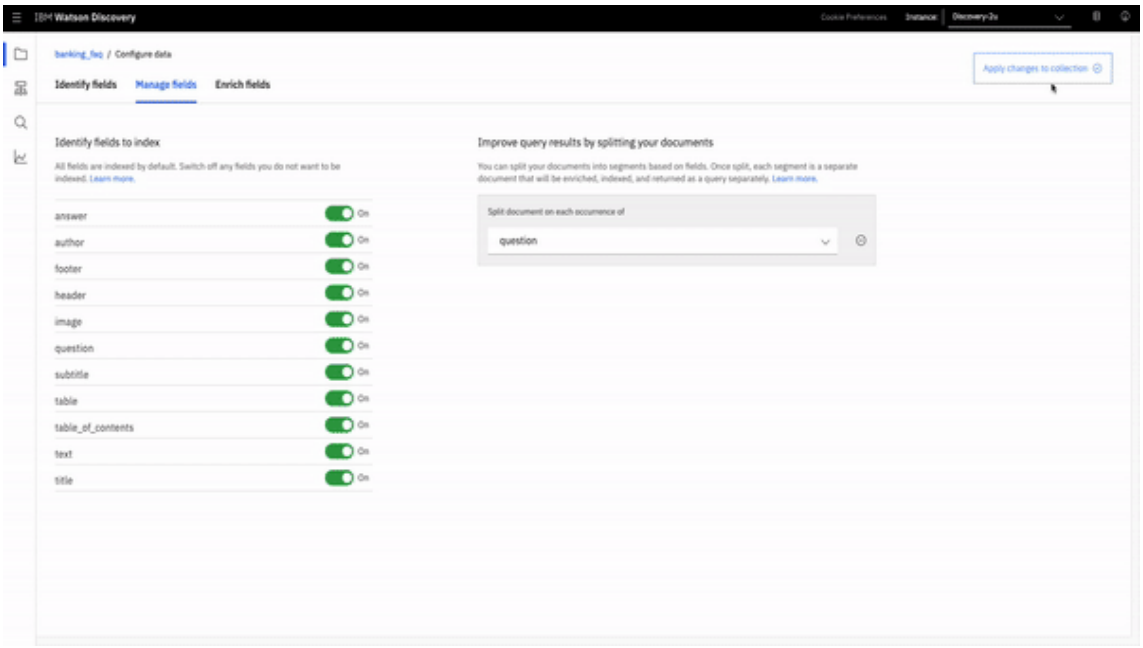
2.18) You can repeat the process for the next 5-6 pages, you will notice that suggestions will be made automatically as you proceed, once you are sure that the model has learnt well and the layouts suggested are good, you can jump to the next step



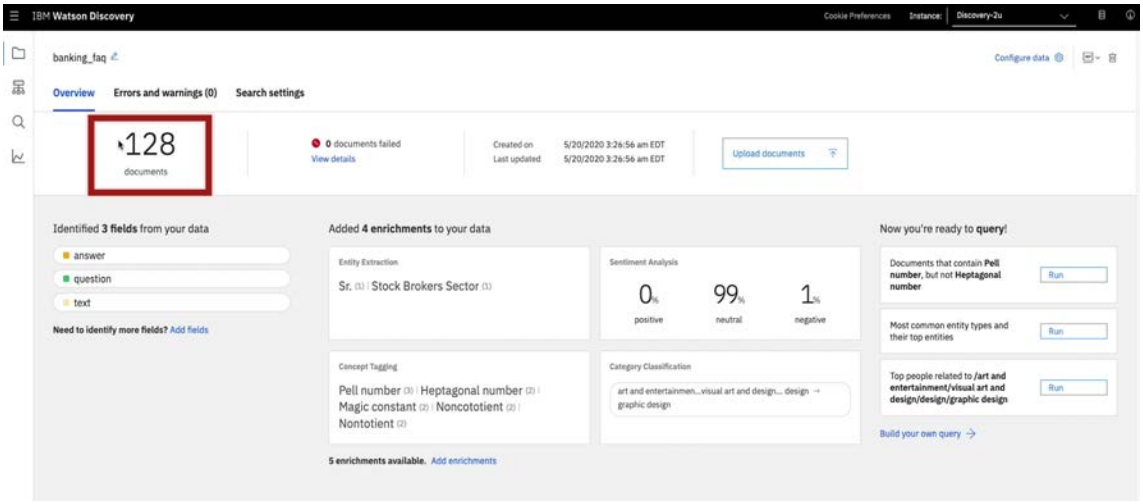
2.19) Goto 'Manage fields' tab and in the 'split document by' drop down, select questions



2.20) Click on Apply changes to the collection, and when asked for upload the same pdf again

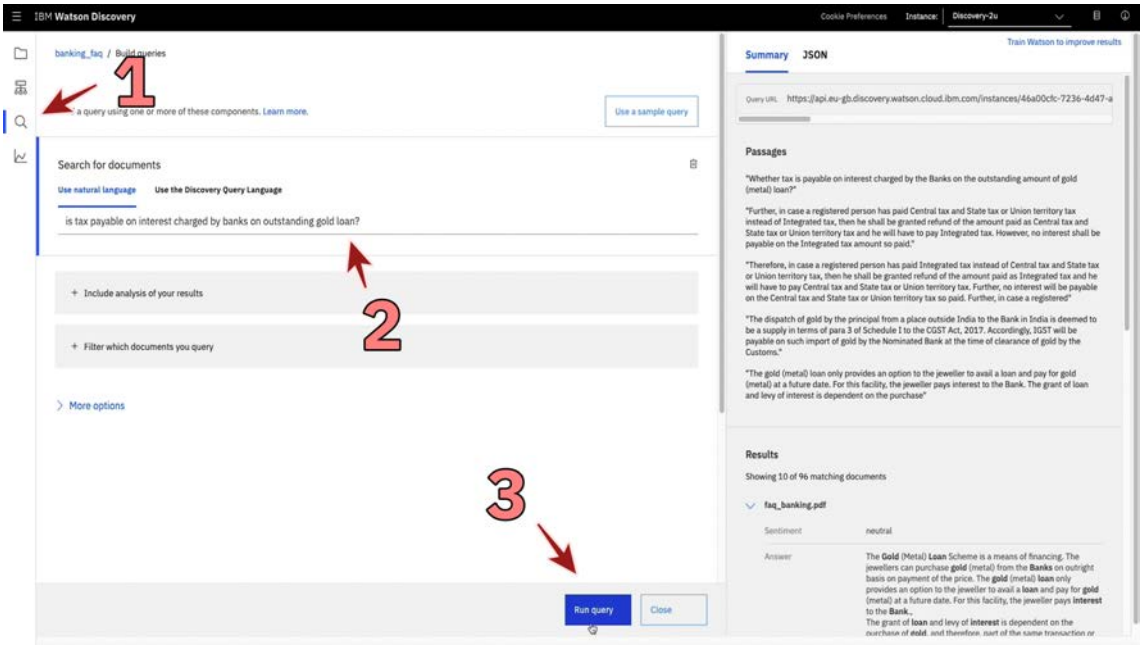


2.21) You can see that now the document has been split into sub-documents basing on the questions column

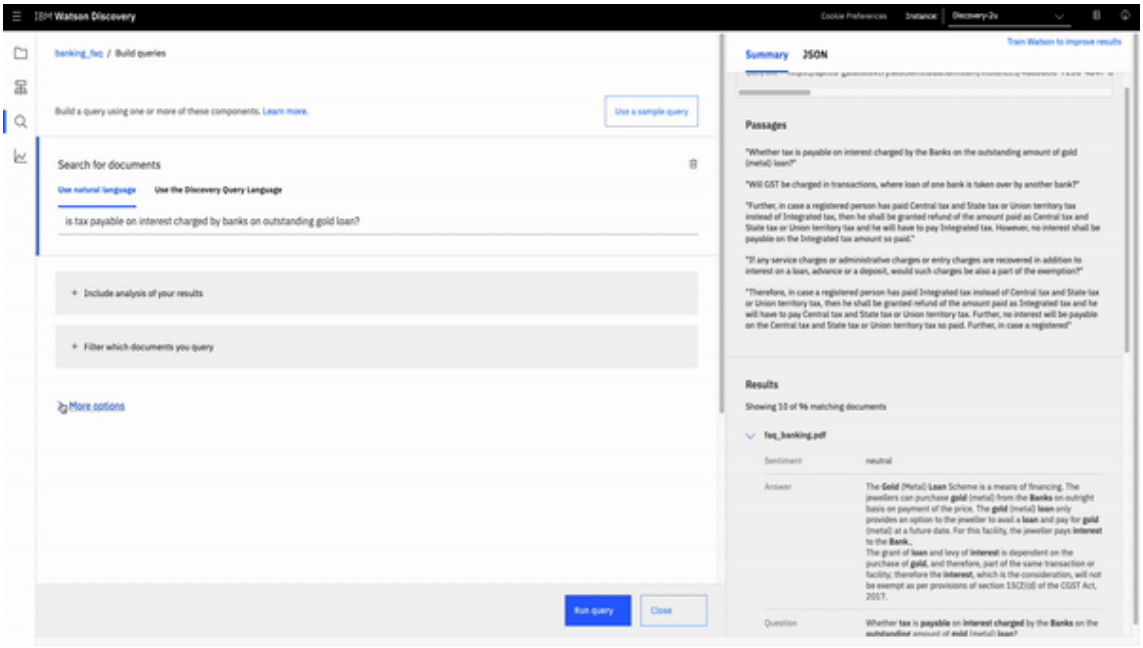


2.30) Now you can test out the results by clicking on the query tab and entering a natural language query like

```
is tax payable on interest charged by banks on outstanding gold loan
```



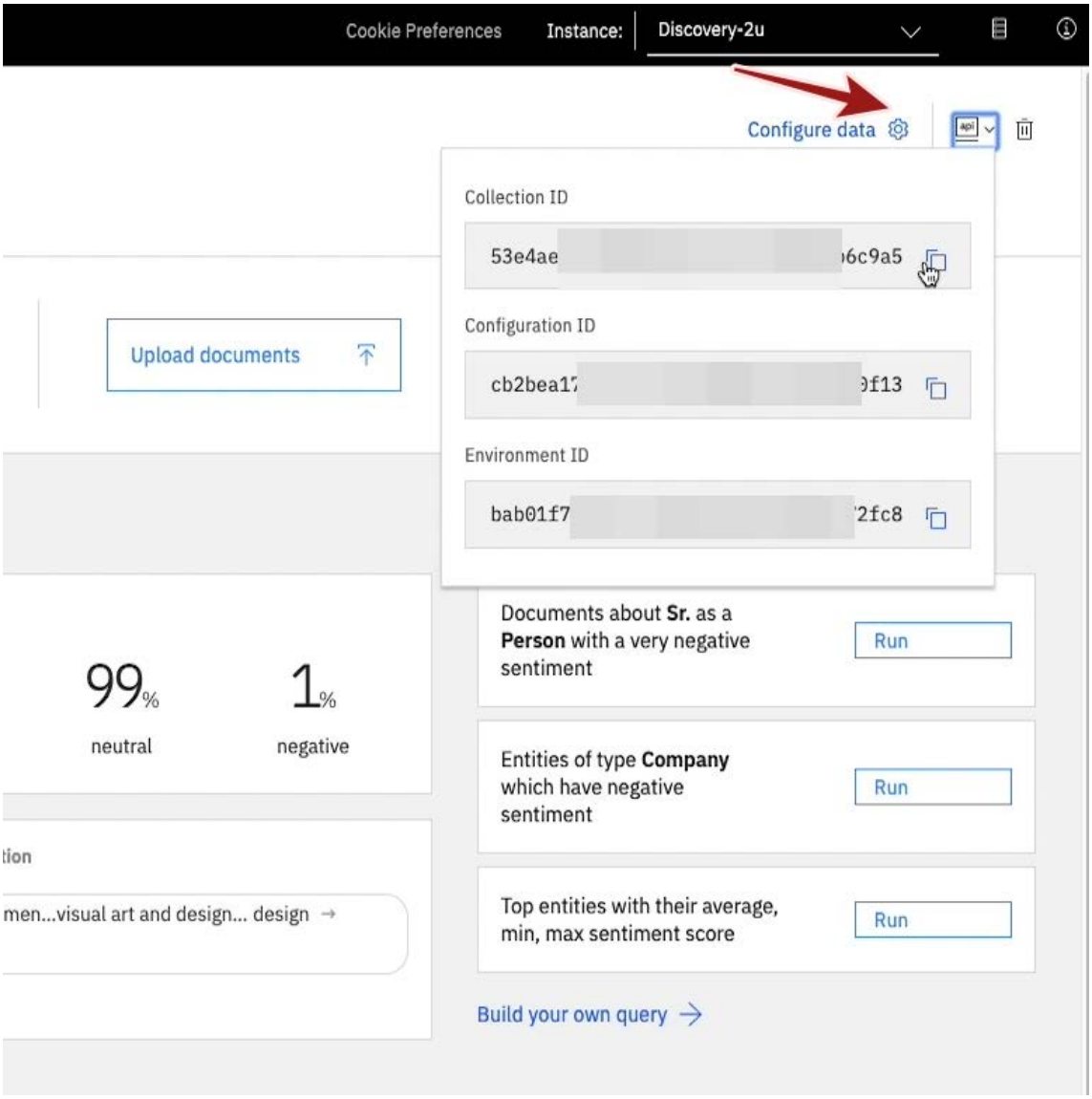
2.31) You can further refine the responses using 'more options'



2.32) Now that we have properly configured our Watson Discovery instance to answer queries from the pdf, lets go ahead and get the credentials to be used

2.33) Click on the api icon on top right and copy

```
Collection ID:
Configuration ID:
Environment ID:
```

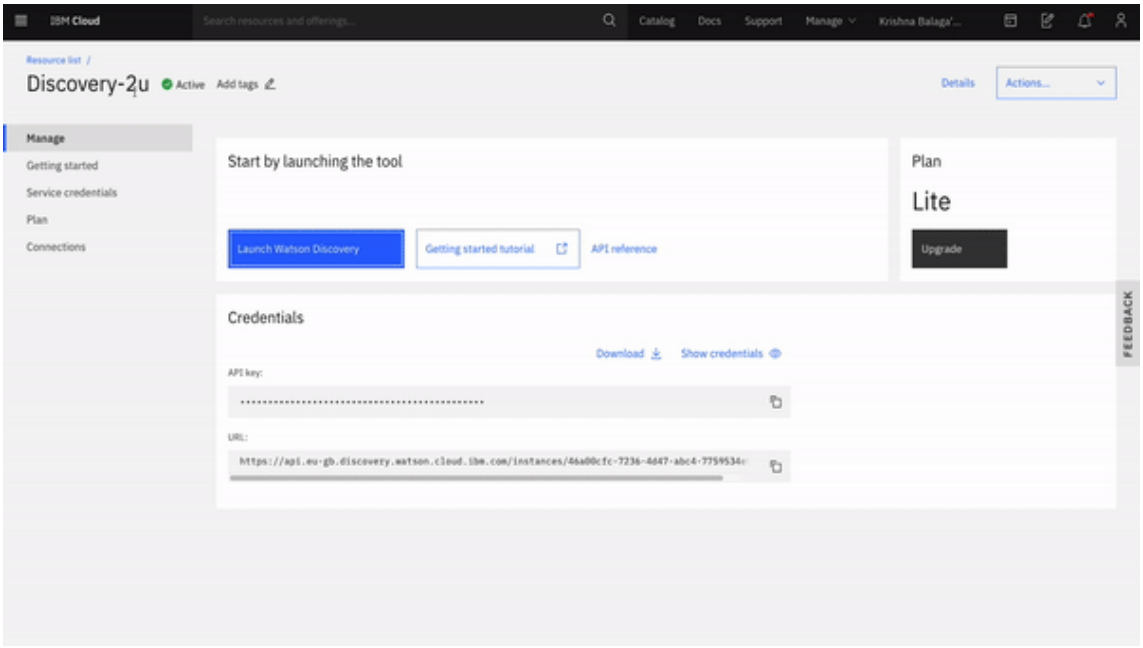


2.34) Navigate to [IBM Cloud services Dashboard]

2.35) Select your Discovery Instance and navigate to the 'service credentials' tab

2.36) Create a new set of credentials and copy the following parameters.

```
"apikey":
"url":
```



Now we can proceed to Step 3

Functions

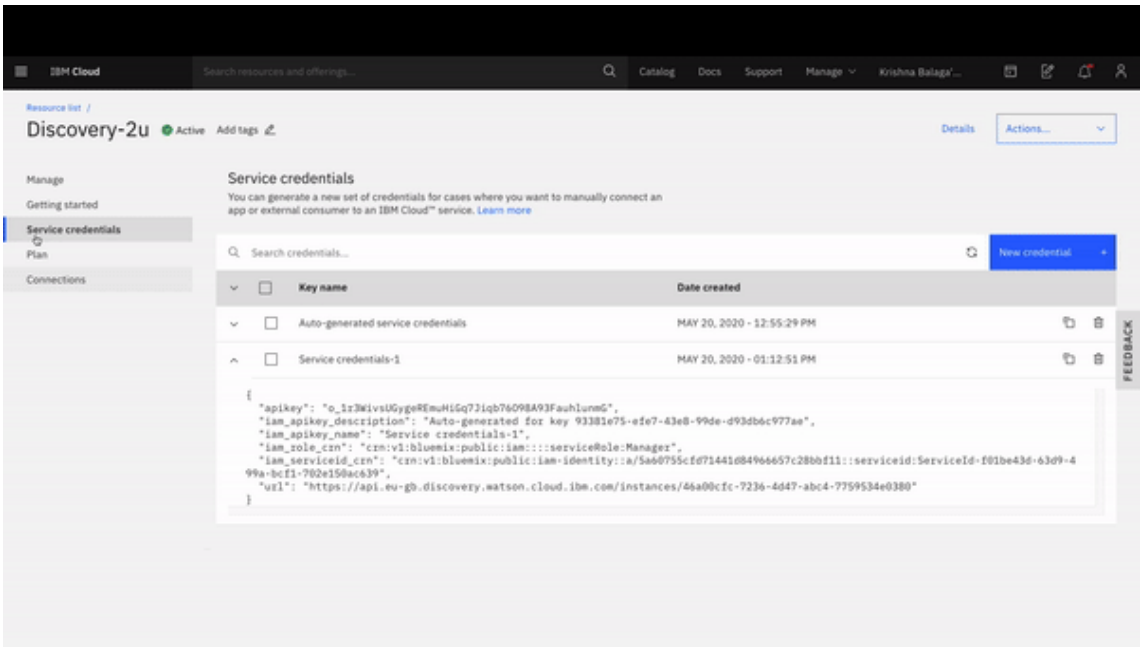
Quick links : Home - Step 1 - Step 2 - **Step 3** - Step 4

Overview

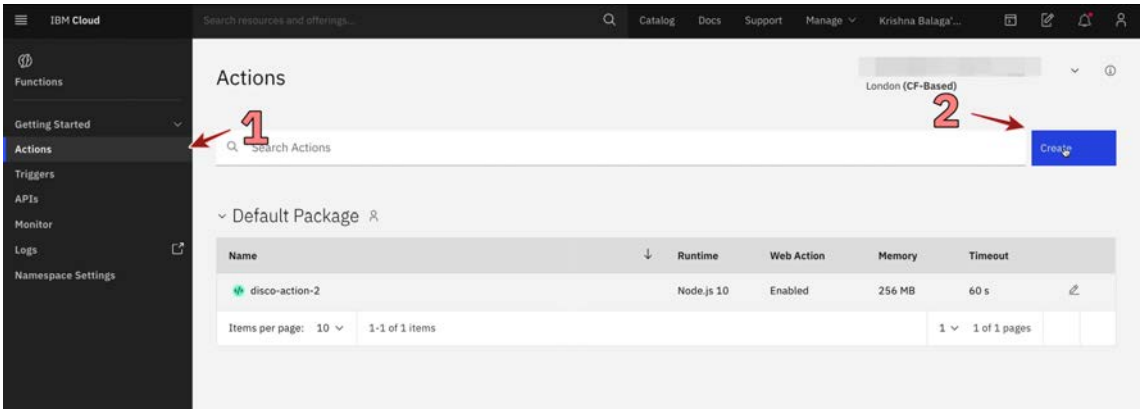
In this, you will create an action using cloud functions that will parse the data fetched from Watson Discovery and Watson Machine Learning.

Create an action in Functions

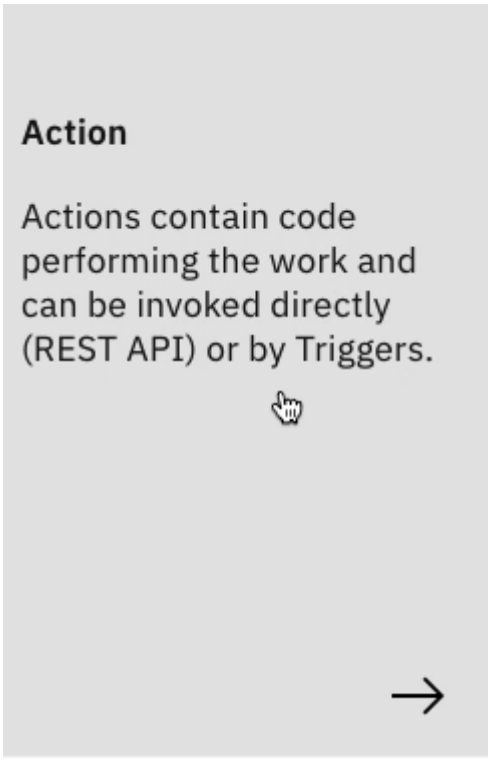
3.1) From the navigation menu, click on Functions.



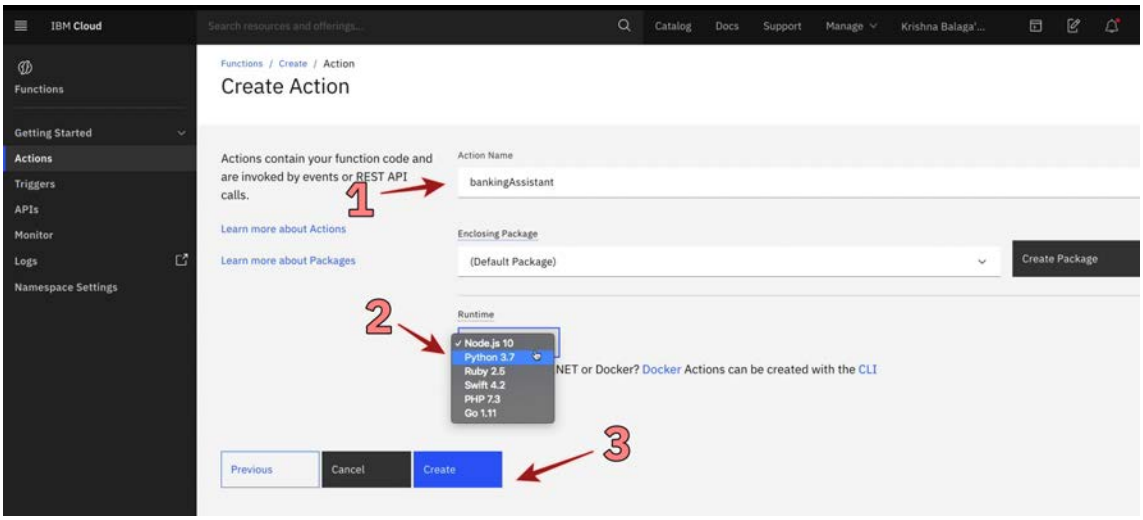
3.2) Navigate to 'Actions' tab and click on 'create'



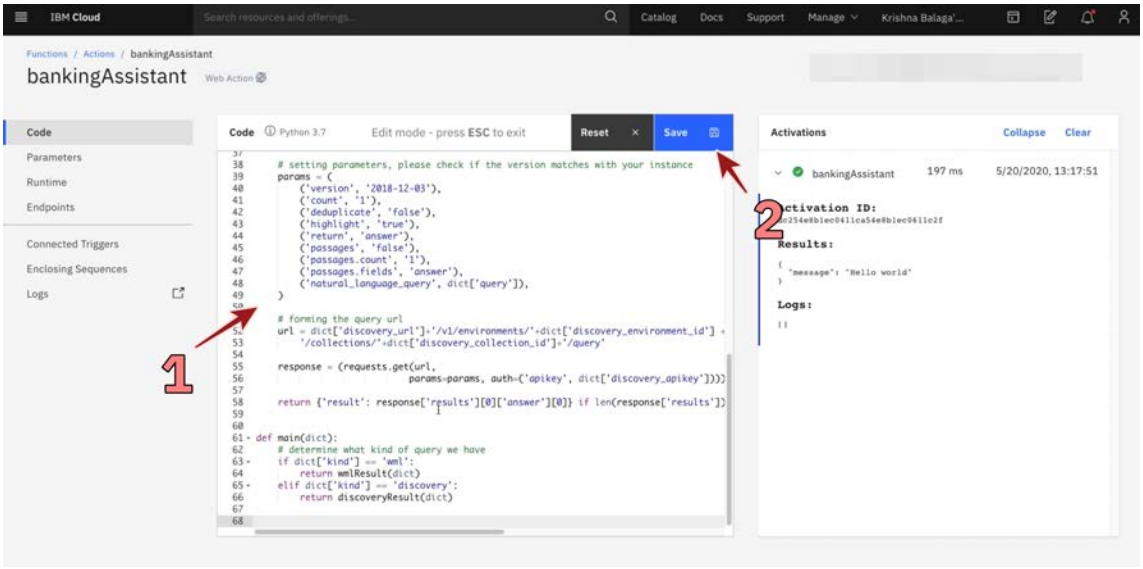
3.3) Choose 'Action'



3.4) Provide a name to your action and change the runtime to python 3.7 and click 'Create'.



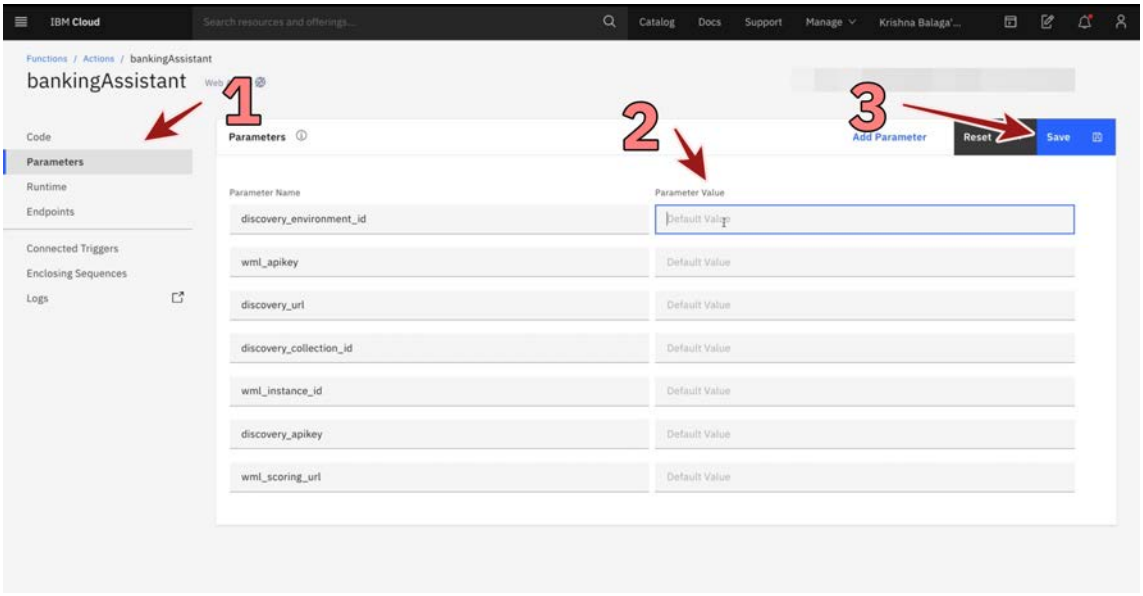
3.5) Paste the code from main.py and then save the function



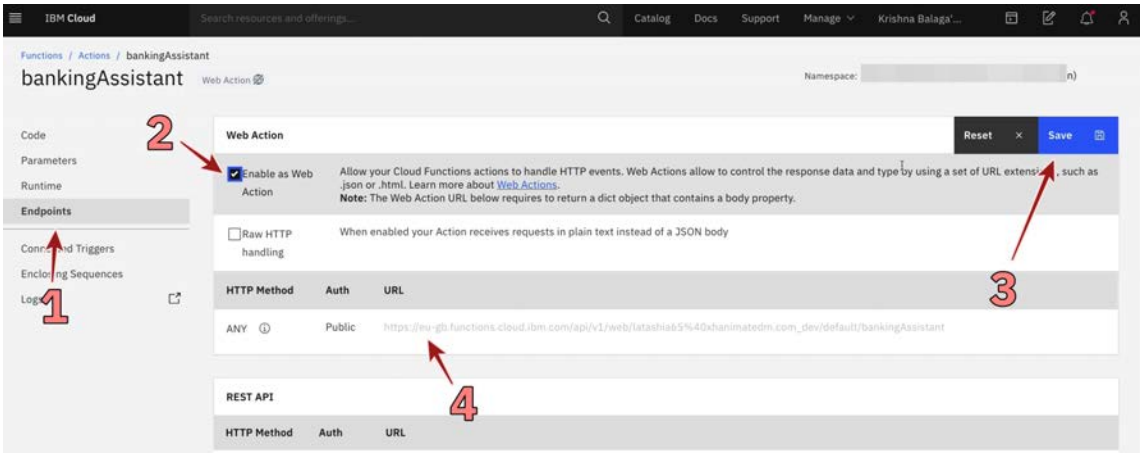
3.6) Go to parameters, click on Add parameter and provide the following parameters that are copied from discovery and watson machine learning services

```
"wml_apikey":"<watson_machine_learning_service_api_key",
"wml_scoring_url":"<watson_machine_learning_deployment_url>",
"wml_instance_id":"<watson_machine_learning_service_instance_id",
"discovery_url":"<watson_discovery_url>",
"discovery_apikey":"<watson_discovery_apikey>",
 "discovery_environment_id":"<watson_discovery_env_id>",
"discovery_collection_id":"<watson_discovery_collection_id>"
```

3.7) Once the credentials are entered click on 'save'



3.8) Go to endpoints, click on "Enable as web Action" and click on save. Then copy the url that is generated in this step.



Once you have the public endpoint copied, now we can proceed to The [Final Step]

Watson Assistant

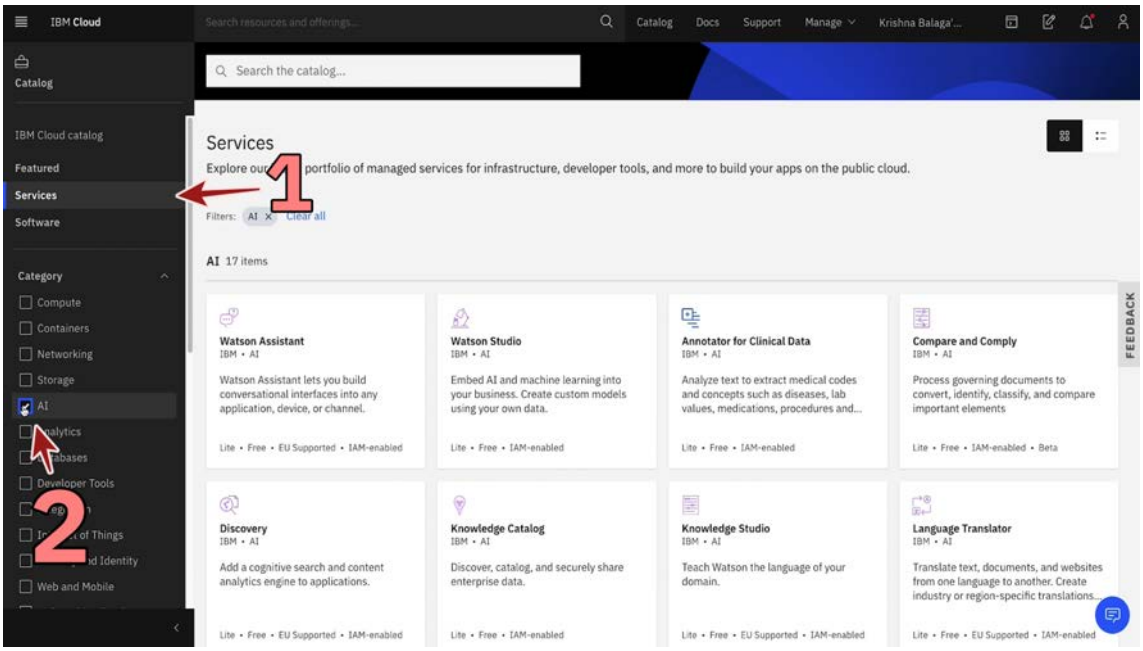
Quick links : Home - Step 1 - Step 2 - Step 3 - **Step 4**

Overview

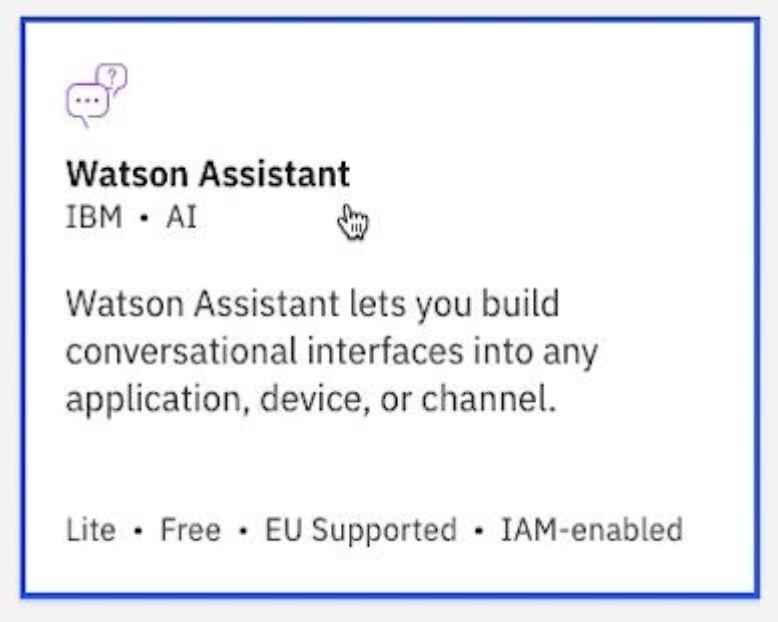
In this, you will create a simple watson assistant flow and enable webhooks which will fetch details from cloud functions.

Setup an instance of Watson Assistant

4.1) Navigate to IBM Cloud catalog. From Catalog, filter the services by AI

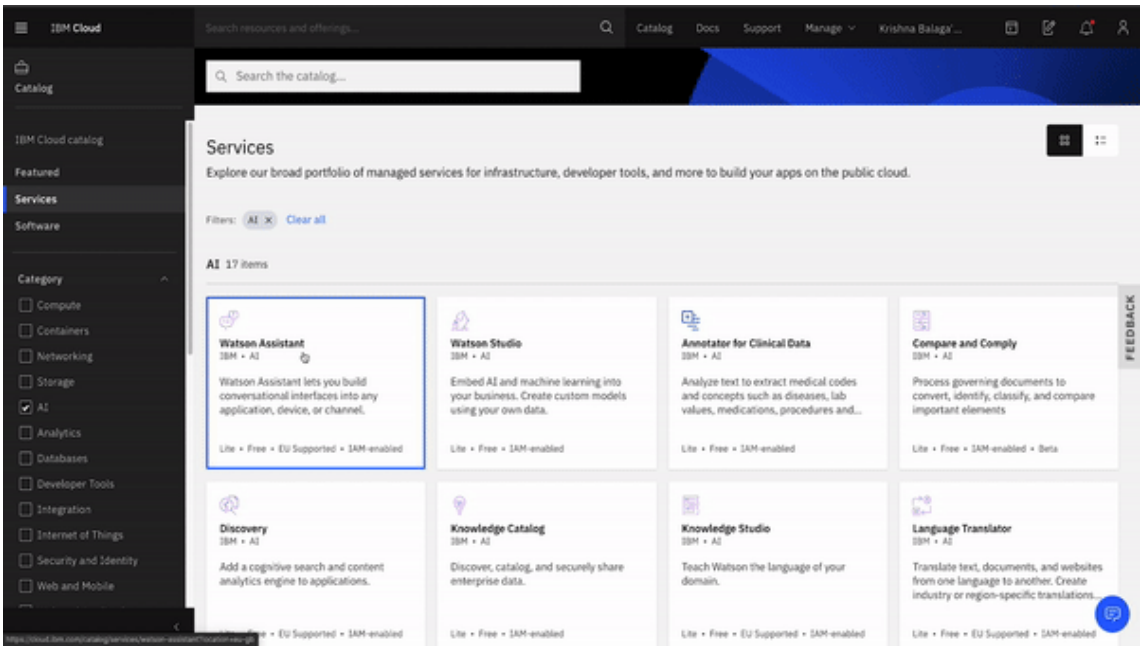


4.2) Click on Watson Assistant.

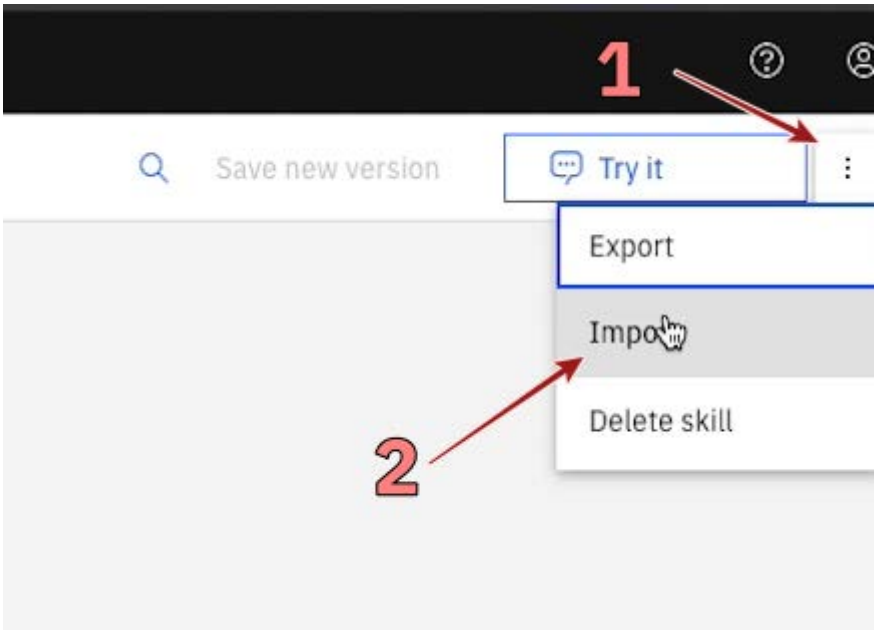


4.3) Leave the default values and 'create' a lite service.

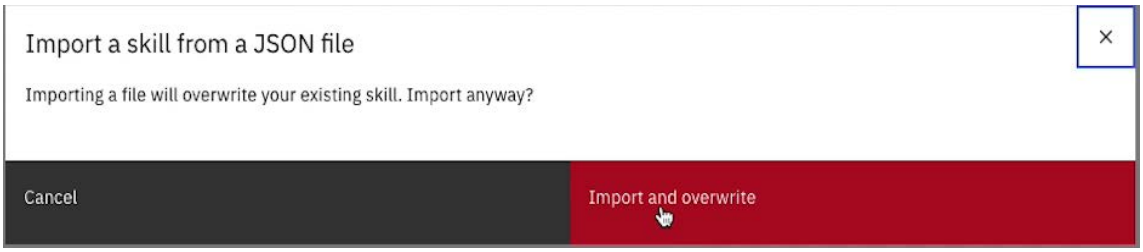
4.4) One the service is provisioned, click on 'Launch Watson Assistant'



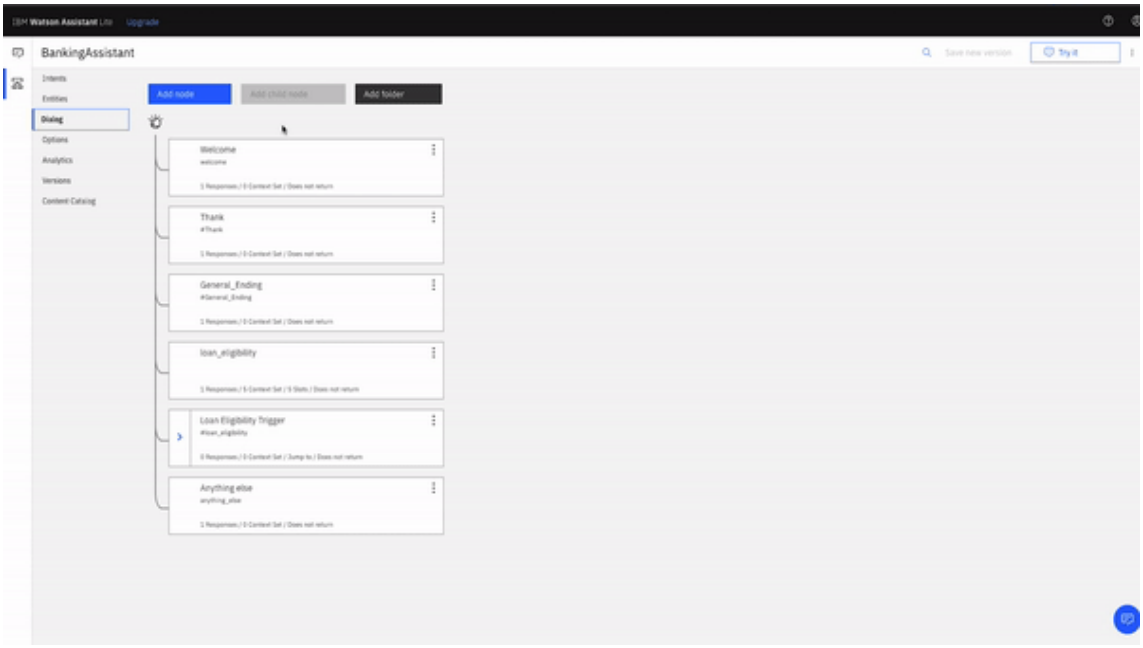
4.5) To create a new skill, click on import flow from the top right hand menu. Import the [skill-BankingAssistant.json]() file



4.6) Select 'Import and Overwrite' when prompted

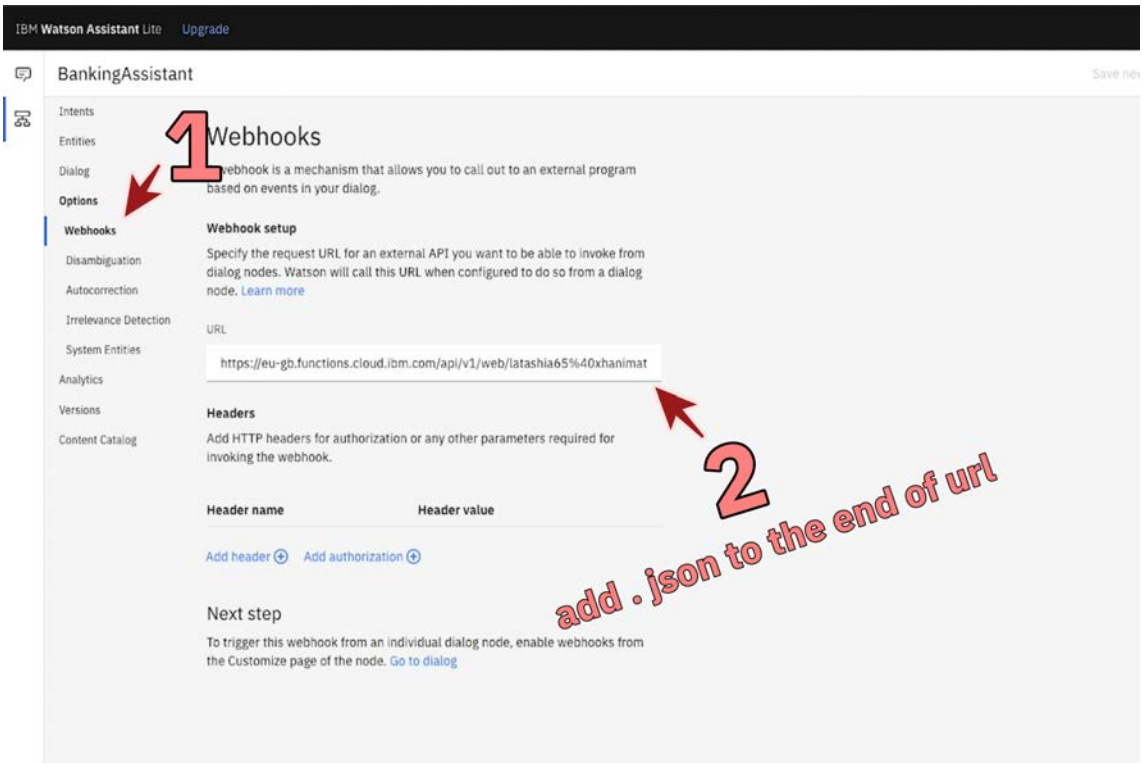


4.7) Once you import the flow, you will be able to see intents, entities and dialogs related to the flow.



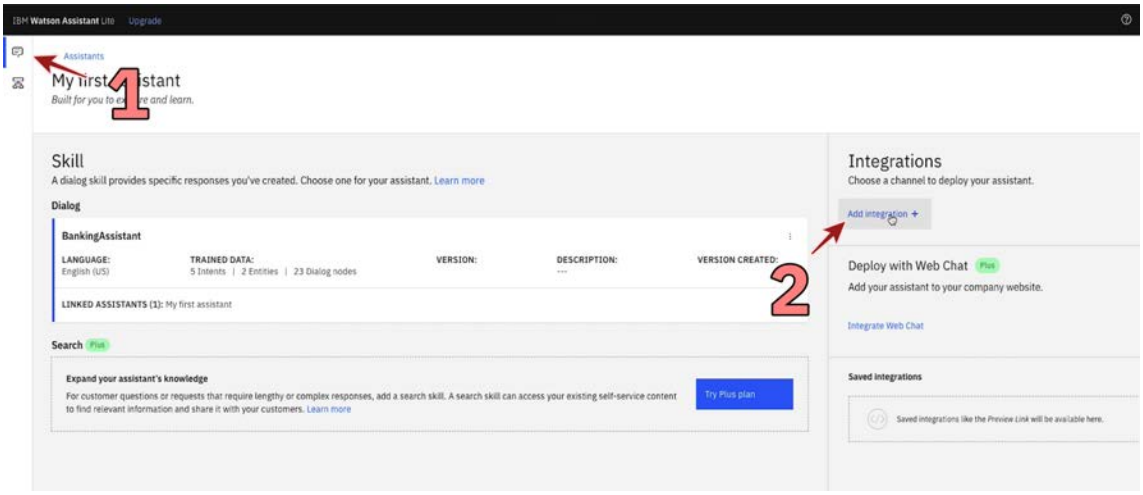
4.8) Goto webhooks and paste the url that we copied from the functions and add .json at the end of the url.

Note: DO NOT FORGET TO ADD .json TO THE END OF WEBHOOK URL

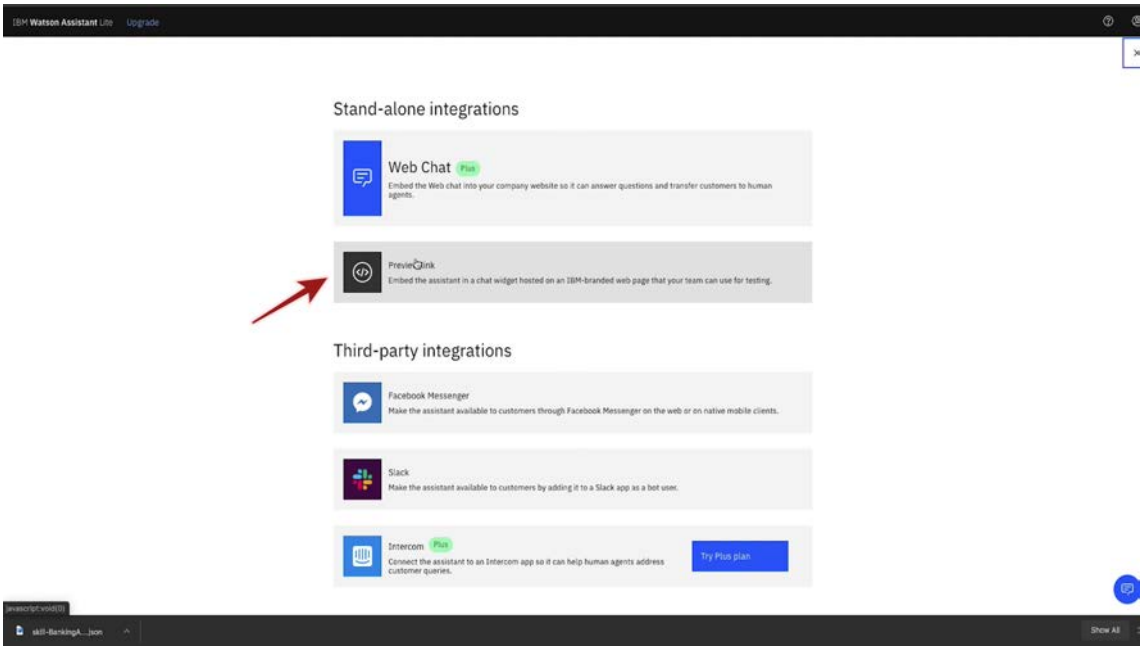


4.9) Now click on the assistant icon on the left menu and select your Assistant.

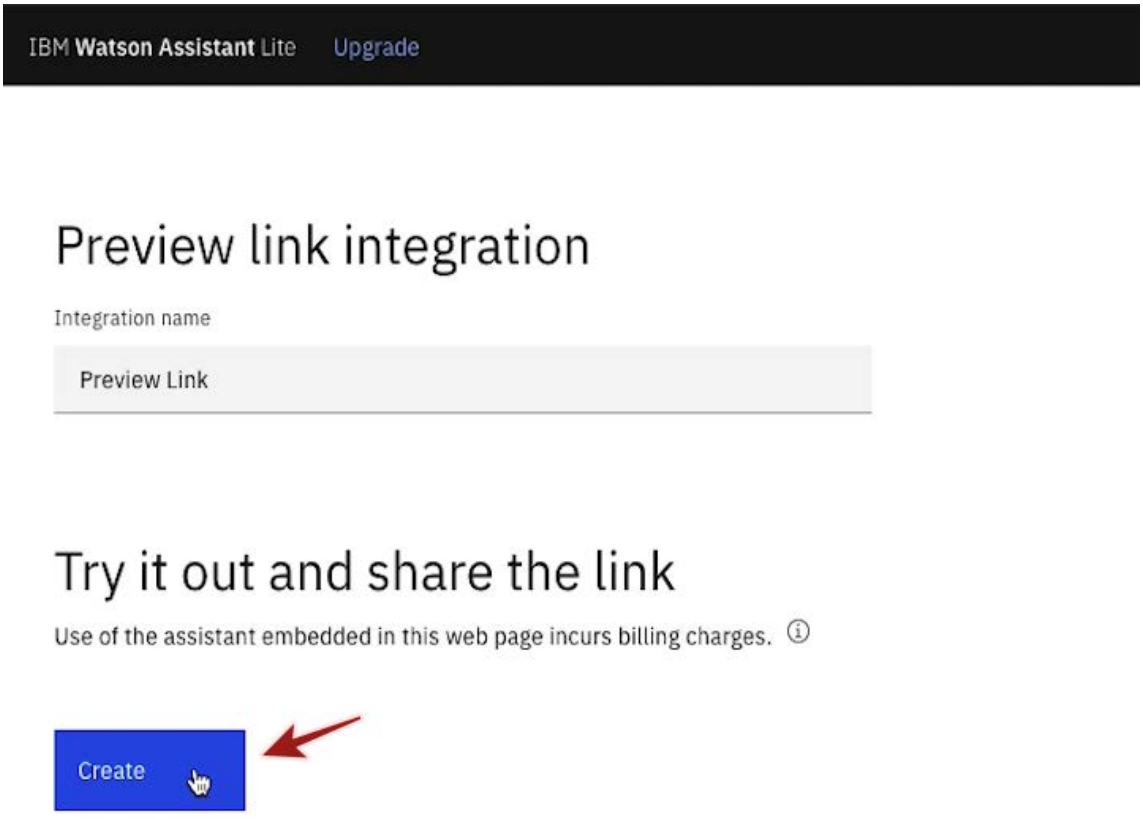
4.10) Click on Add integration



4.11) Add a stand-alone 'preview' integration



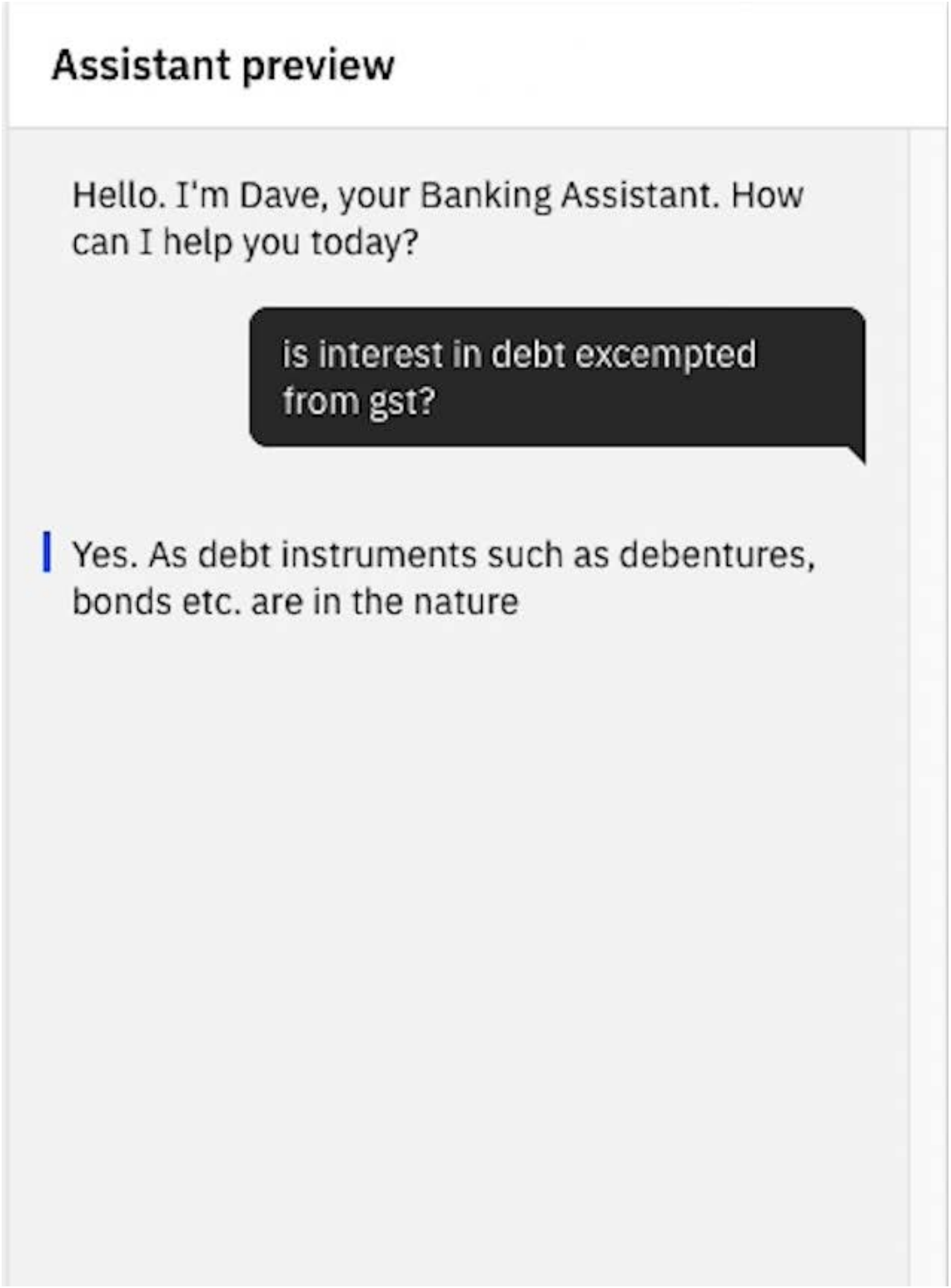
4.12) Click on 'Create'



4.13) Click on the generated link to open up a preview of your Smart Assistant.

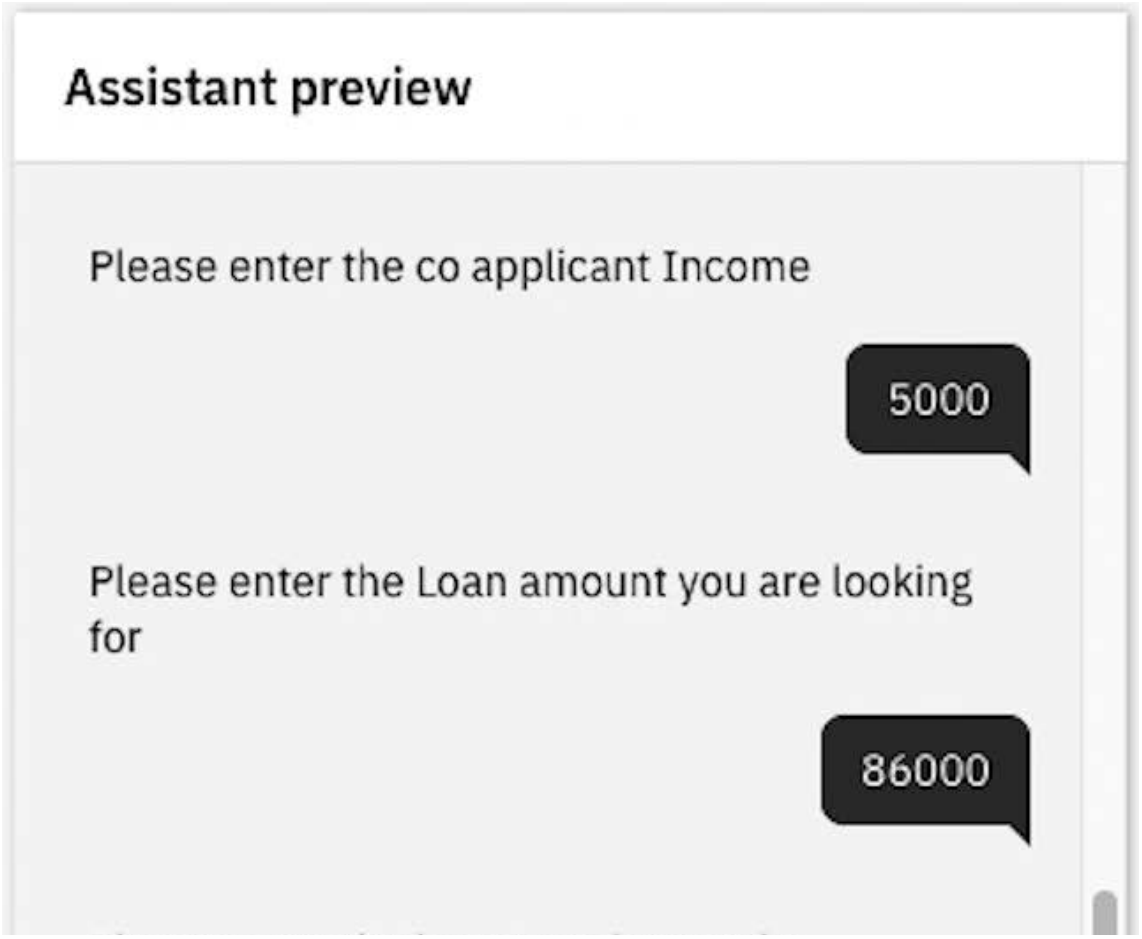
4.14) You can query it with any questions related to the document

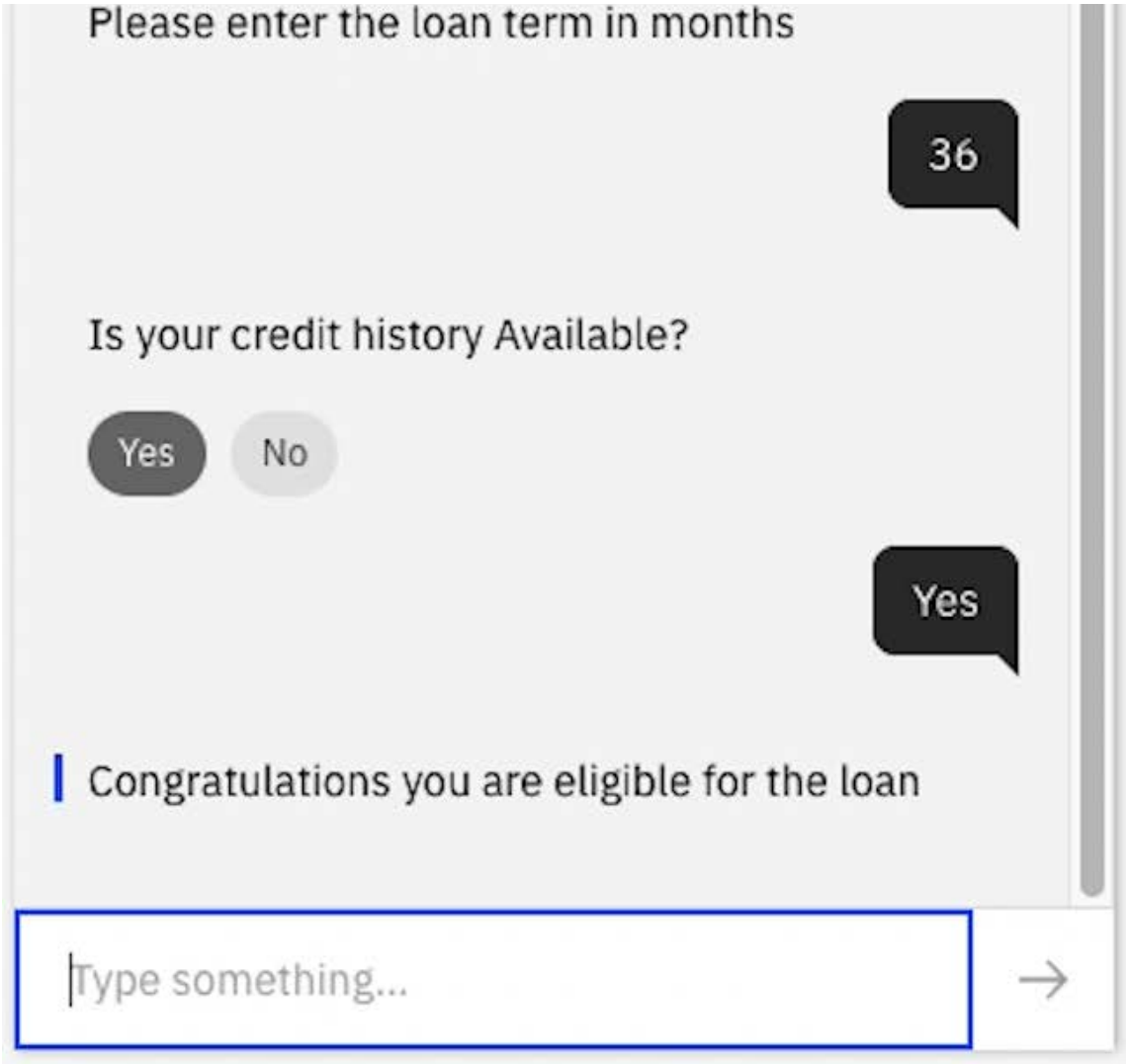
```
Example:
1. Is interest in debt exempted from gst?

2. Would assignment or sale of unsecured debts be liable to gst?
```



4.15) You can check the prediction made by your assistant using Watson machine learning service

```
1. Am i eligible for loan?

Income: 4500
Co-applicant income: 5000
Loan amount: 86000
Term :36
Credit history available: yes
```





Congratulations! you've deployed a multi functional smart assistant :)