Watson Discovery

Lab Exercise

Topic: Watson Discovery for Agent Assist - Banking

Version: **1.8**

Updated: Jun 12, 2019

Contents

Course overview

Credits

This project is a collaboration between many experts within and outside of Watson in the hopes of broadening skills within IBM, our clients, partners and the developer community.

If you have suggestions for how to improve this guide, please send a note to gsolian@us.ibm.com.

Lab Structure

When completing this lab, we included explanations for reference to support the general understanding of the subject matter and to get a better sense of what you are actually doing.

To complete the exercises, you only need to perform numbered steps.

This lab exercise is designed for every student to work independently using a Mac or PC. Each student requires their own IBM Cloud account to create an IBM Watson Discovery instance in Cloud.

Exercise Environment

The lab exercise will be performed on the IBM Watson Discovery provided as part of the AI catalog on IBM Public Cloud.

Course Focus

The lab consists of 4 main sections.

1. Getting started with Watson Discovery and creating your own instance and environment.
2. How to ingest content within IBM Watson Discovery for Agent Assist use cases.
3. How to enrich your data within IBM Watson Discovery.
4. How to extract relevant insight from your data set by querying the collection.

Preparation

To prepare for the lab exercises, locate the Lab folder provided to you by your instructor. Make sure to unzip the Lab Folder to a directory on your local hard drive.

The lab folder contains the following files:

File name	Description
WDS Lab Exercise for Banking	Lab manual
Banking_LabSamplePDF	Real Chase FAQ document available as a PDF
Banking Process PPT	Mock PPT to describe internal mock processes
LabSampleDoc2	Additional PDF focument (for future use)

0 Getting Started

While this Lab can be performed using Linux, the current version of this guide assumes the use of a Windows or iOS computer to complete all tasks.

To perform these lab exercises, follow these instructions to set up your computer.

0.1 Overview

This lab guides you through the configuration steps required to use Watson Discovery Service to satisfy an Agent Assist scenario. Watson Discovery Service will be configured tohelp knowledge workers find relevant insight from complex documents. The lab is meant to guide Tanya, the ABC Bank Solution Admin, on how to configure WDS to satisfy the use case. The end-user is Henry, an ABC Bank Agent, responsible for quickly providing answers to customers.

The lab walks through the development activities required to configure IBM Watson Discovery Service to satisfy these use cases. What this lab does not cover are the broader best practices and considerations that you should follow when creating an enterprise-grade solution.

0.2 Working with IBM Cloud

0.2.1 IBM Cloud

IBM Cloud is an implementation of IBM's Open Cloud Architecture, leveraging Cloud Foundry to enable developers to rapidly build, deploy, and manage their cloud applications, while tapping a growing ecosystem of available services and runtime frameworks. The purpose of this guide is not to introduce you to IBM Cloud, which you should already be familiar with, at least on a high level.

0.2.2 AI services

IBM Watson is a platform of AI services, designed to help developers build solutions and extract insight from Big Data. AI computing systems learn and interact naturally with humans to augment their ability to make better decisions from data.
As such, Watson offers a variety of AI services that cover various aspects of natural interaction including text (**Watson Discovery**, **Natural Language Classifier**, **Watson Assistant**), images (**Visual Recognition**), and speech (**Speech To Text** and **Text To Speech**).

Furthermore, IBM offers services to understand a user's personality (**Personality Insights**) and emotional/social tone (**Tone Analyzer**) in a scalable manner.

0.2.3 Watson Discovery

This guide takes an instructional approach to working with the IBM Watson™ Discovery, a cognitive search and content analytics engine that allows applications to identify patterns, trends and actionable insights that drive better decision-making.

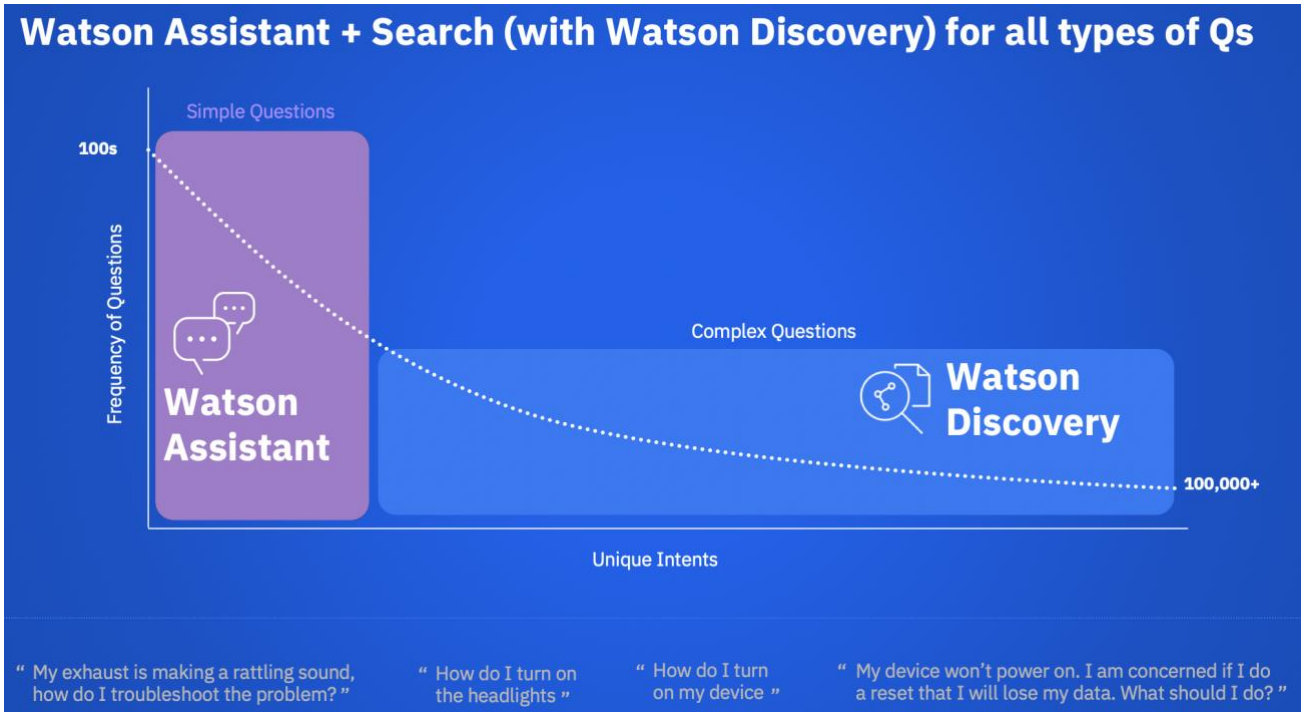
Watson Discovery Service comes with an easy-to-use graphical interface to connect, ingest, configure, and query content indexed into collections. Creating and querying your first collection using the IBM Watson™ Discovery (WD) entails the following steps:

- Creating your Watson Discovery Service environment;

- Configure the Watson Discovery Service pipeline to convert, enrich, and normalize your content (involves using a sample data file);
- Ingest your content in a Collection as a searchable text index; and
- Creating queries to extract relevant insight from your Collection.

IBM Watson Discovery is designed to securely unify structured and unstructured data with pre-enriched content, and uses a simplified query language to eliminate the need for manual filtering of results. The input data can be a CSV, PPT, HTML, DOC, PDF, JPG, or JSON document. WDS returns the output in the form of JSON which can be easily queried to gain insights into the data.

IBM Watson Discovery service can also be used to augment Watson Assistant and/or address use cases where "long tail" less frequently asked questions require answers obtained from documentation. This use case will not be covered in this Lab.



0.3 Prerequisites

This section provides instructions to help you get started quickly with the IBM Watson Services.

0.3.1 Obtaining a IBM Cloud account

IBM Cloud is a cloud PaaS (Platform as a Service), which allows you to host your application on-line and bind it to a variety of SaaS service offerings from IBM including Watson services.

Learn more at https://www.ibm.com/cloud/ and if you are new to IBM Cloud, you can create a trial account at https://cloud.ibm.com/registration.

1. Direct your browser to the Cloud home page: https://cloud.ibm.com/ to access your dashboard
2. If you do not yet have a Cloud account, click **Sign Up** on the top right
3. Enter requested information and click **Create Account**

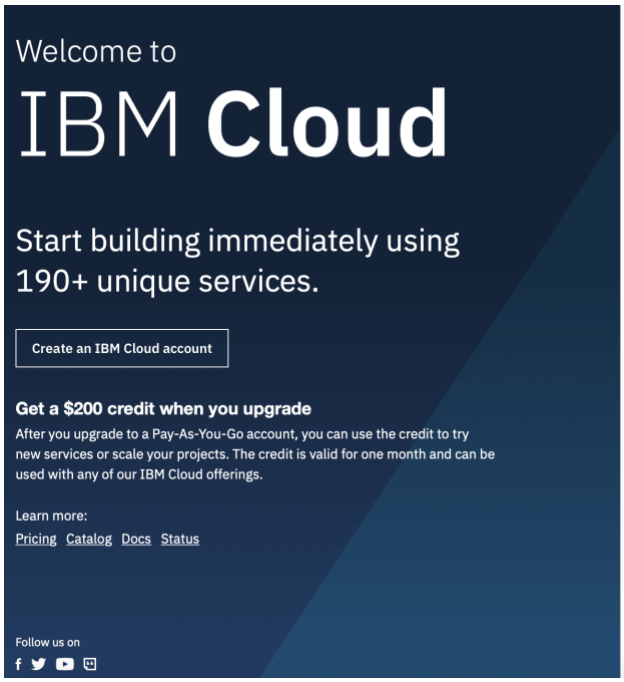
If you use your personal e-mail address, you have 30 days to evaluate Cloud. Some services, such as Watson Discovery Service, are free for limited use during the trial period.

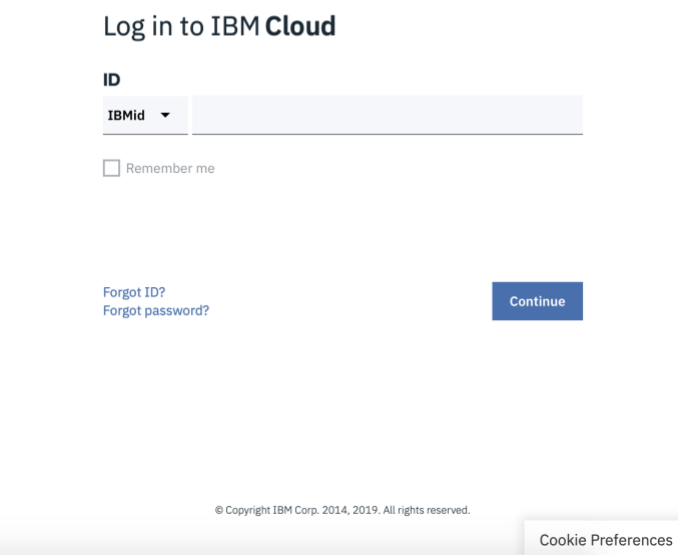
0.3.2 Downloading OS-specific coding-friendly editing tool

4. If you are using a PC, you can use **Notepad ++** (https://notepad-plus-plus.org/download)
5. For Mac, use **Sublime Text** (http://www.sublimetext.com/3) → also works for Windows

1 Creating Your Watson Discovery Instance

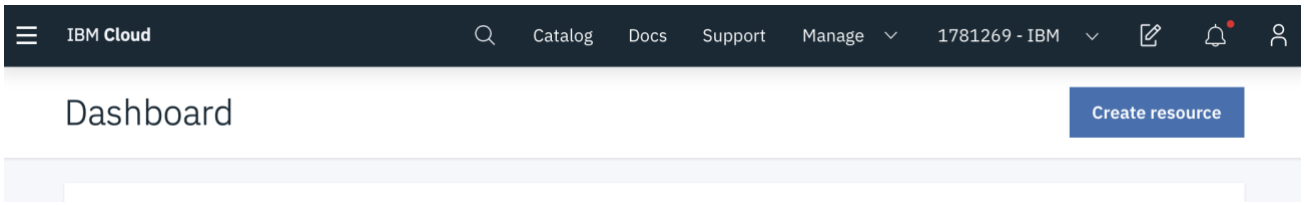
1. Navigate to IBM Cloud - : https://cloud.ibm.com/ and Log In



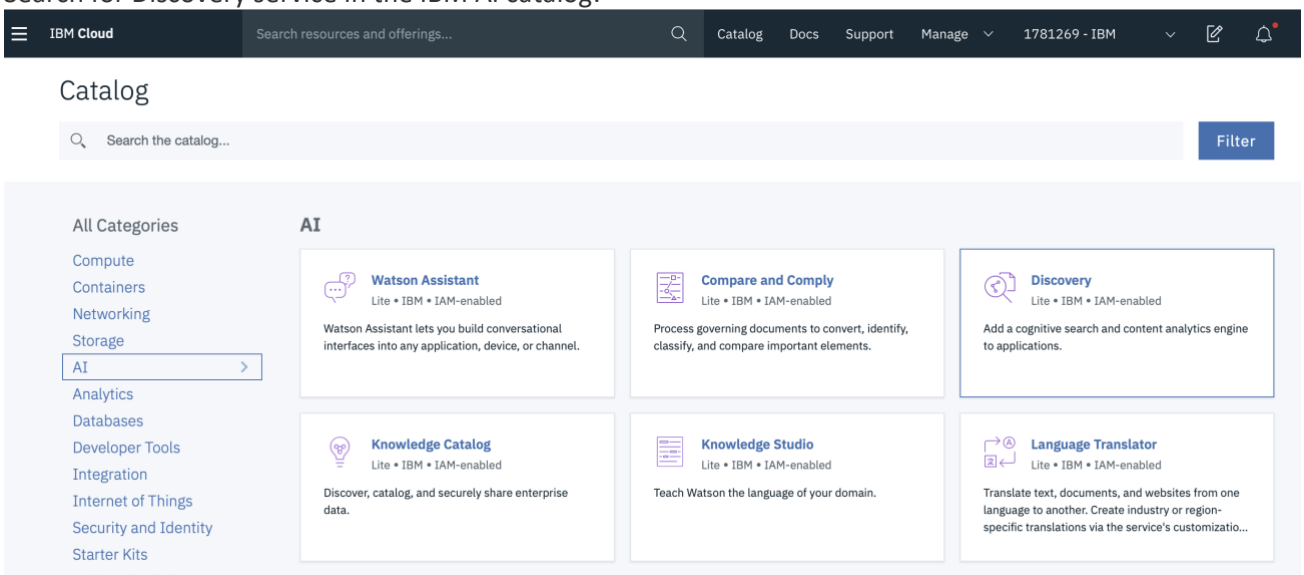


2. Use your organization credentials obtained in Step 0.3.1 to Log in to IBM Cloud.

3. Once logged in, navigate to the Cloud Catalog by clicking on Catalog in the top right-hand corner.



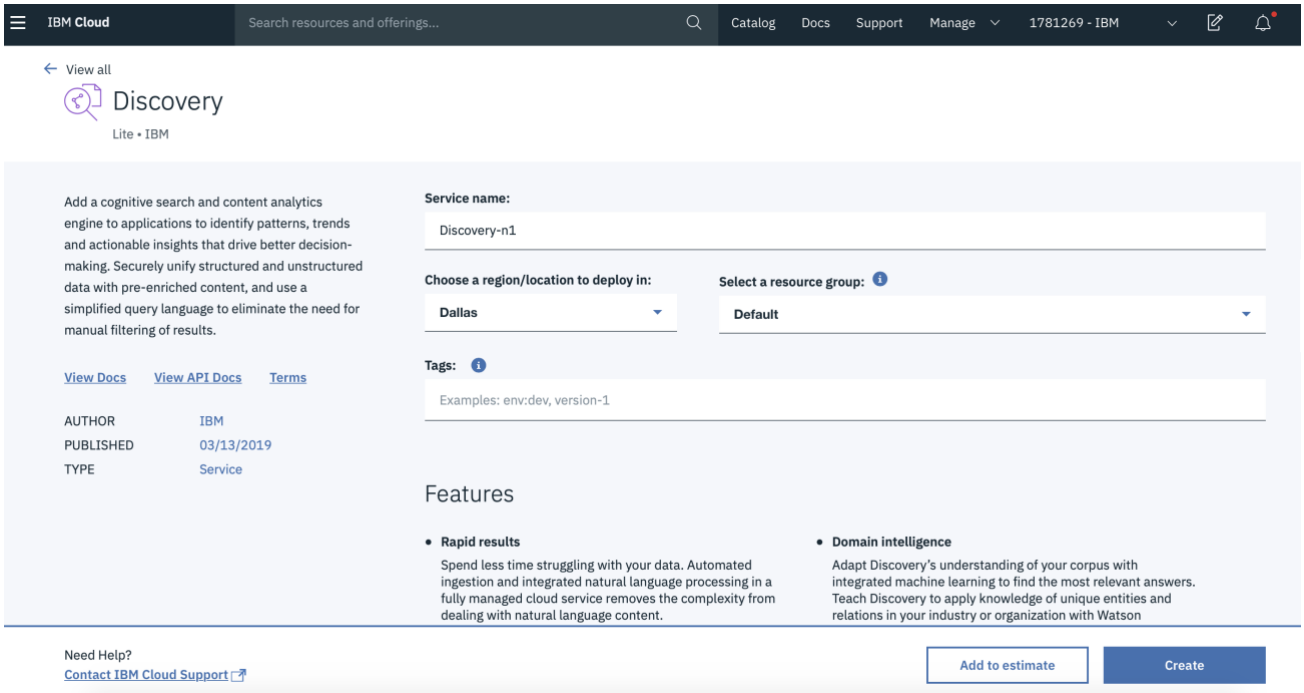
4. Search for Discovery service in the IBM AI catalog:



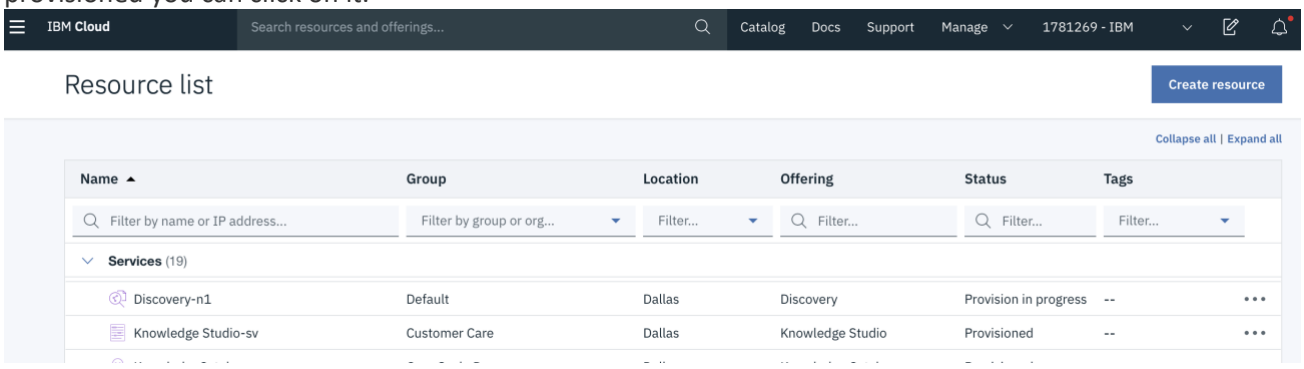
5. Click on the Discovery tile

6. Within this window, you can provide a unique Service name (e.g. Discovery_TeamName). Click on the blue box under Service name to provide a unique name to your instance. Do not make any changes to the Credential name

7. Create a trial service instance by selecting the Lite Plan option (default setting) and by clicking Create.

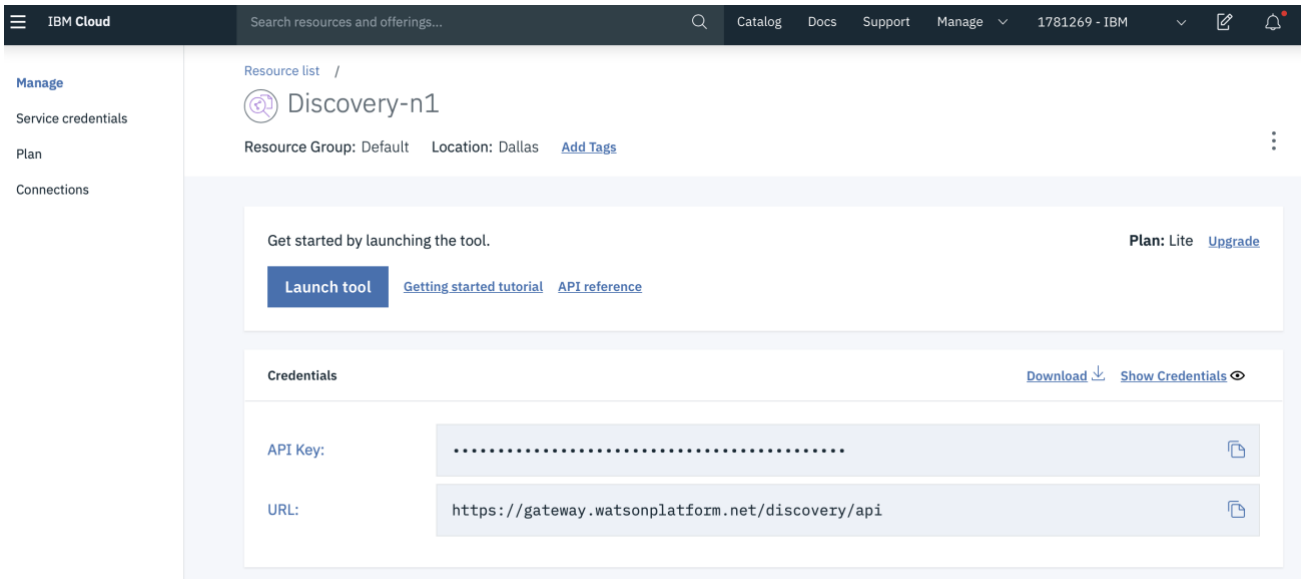


8. IBM Cloud will now instantiate your personal Watson Discovery Service instance. It will automatically redirect you to your Resources Dashboard while the system is being provisioned. Once it has been provisioned you can click on it.



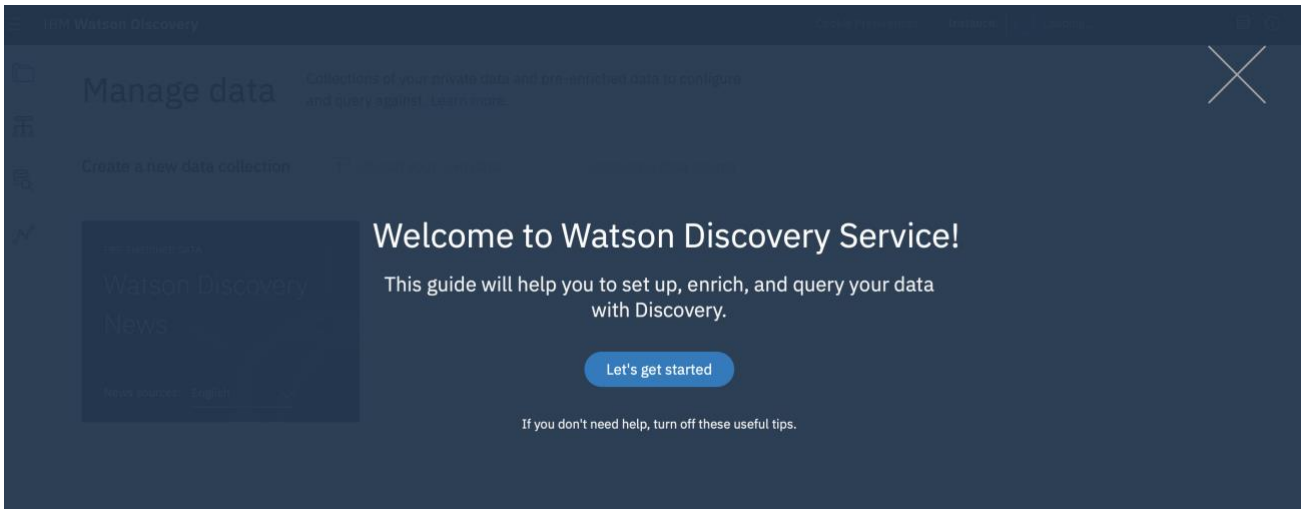
If you close the tab and would want to re-access it, you can navigate to the Resources List dashboard and by selecting the created discovery service from the list of services created in your account. The list of the services you have created can be found at https://cloud.ibm.com/resources.

9. When you click on Discovery instance from your Resource List you will be directed to the service dashboard.

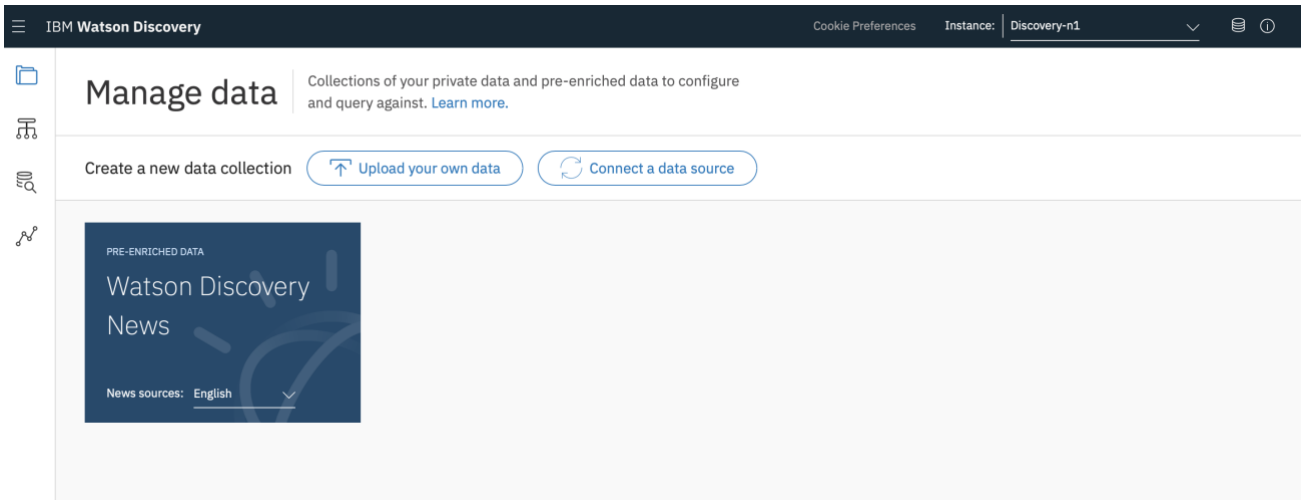


10. Launch the discovery tool by clicking “Launch Tool” button from the discovery service instance

11. Launching the tool takes you to the dashboard with welcome message overlay. Click on the cross button on the right top to close the overlay window.



12. In the dashboard, you can see the collections present in your Watson Discovery Service environment. An option is provided to create a new collection.

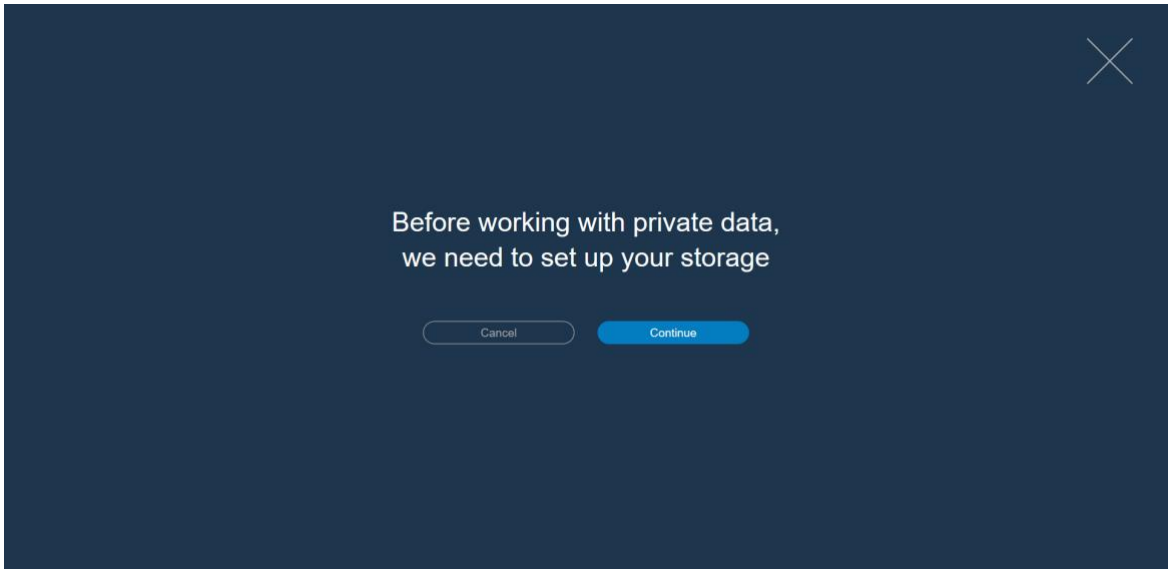


A new Watson Discovery Instance will come with a default environment, configuration and a pre-enriched collection, Watson Discovery News. To upload data, you will have to create a new collection.

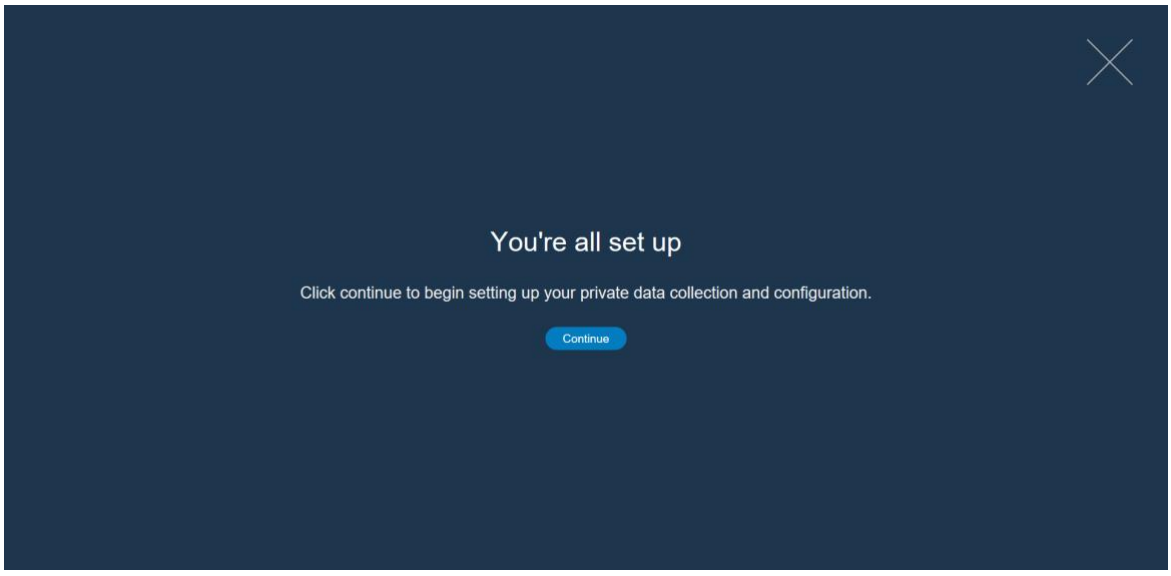
2 Configuring Your Watson Discovery Service Instance

1. Create “Agent Assist” collection by clicking on “Upload Your Own Data” button.

2. When you create your first collection, the tooling will indicate that the storage needs to be setup before working with private data. Click “Continue” button. This process can take 1-2 minutes

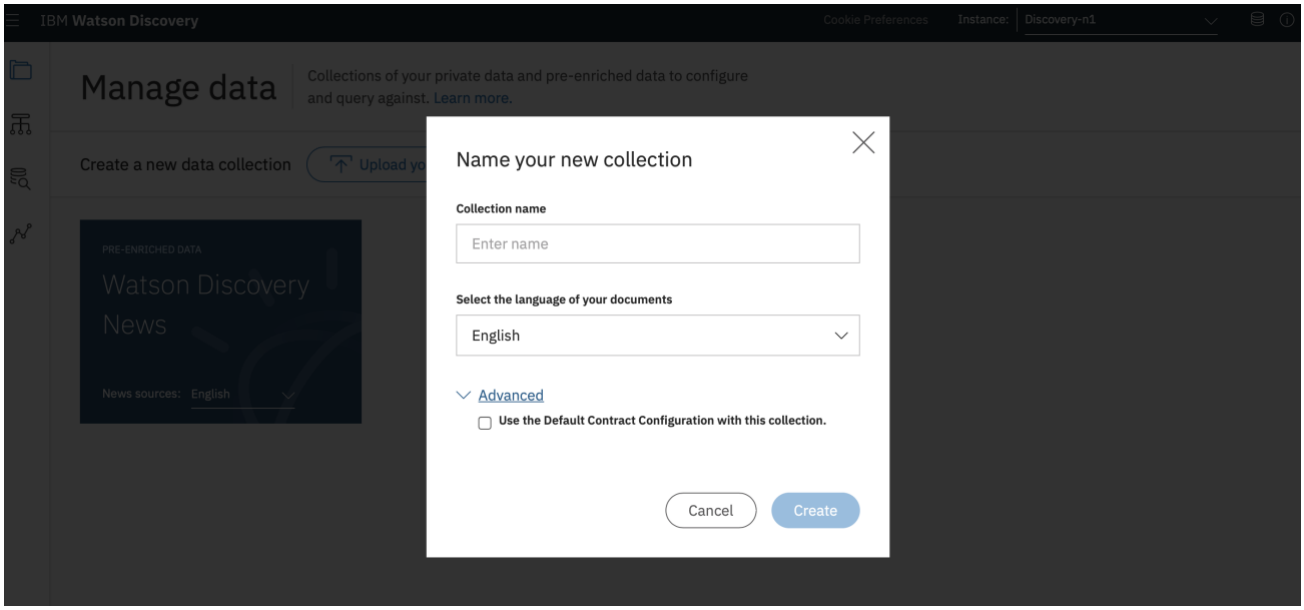


3. You get a message saying, “You’re all set up” once the storage is provisioned and the collection is created. Click “Continue” button

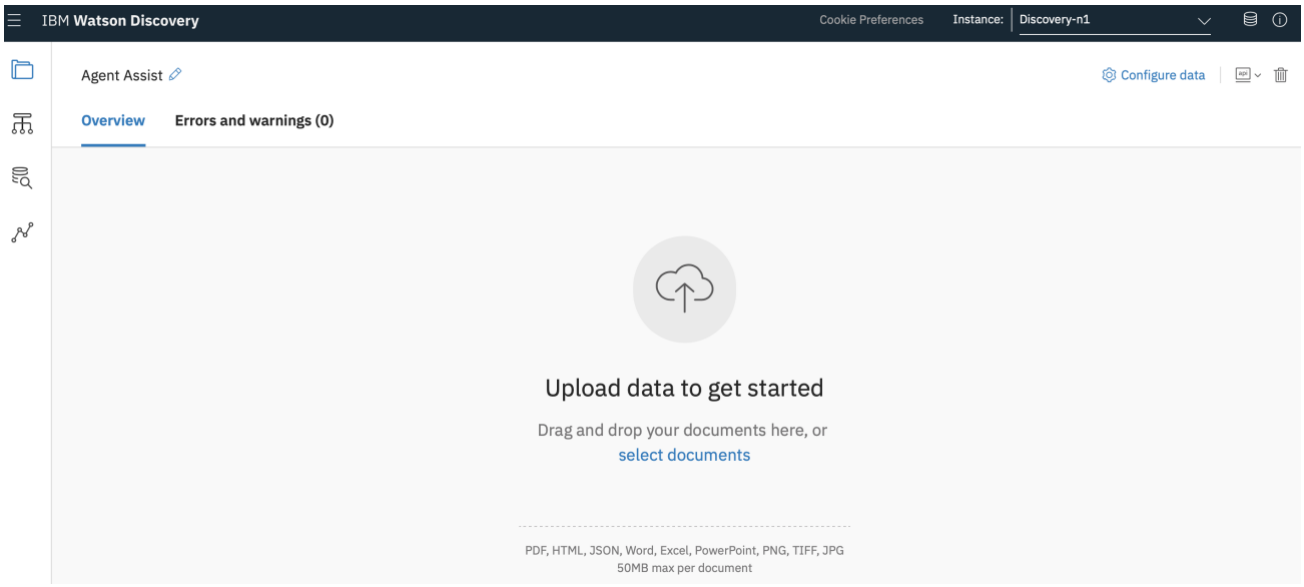


4. Specify the name for your Collection. In this Lab, you will create a collection that you will want to name “Agent Assist”.

5. Notice that English language is selected by Default. Under “Advanced” you can select a Contract specific NLP model. This will not be used in this Lab. Click the Create button.



6. The collection landing page opens up automatically. The collection landing page displays information like configuration id, environment id, collection id and the current configuration that was selected for your collection.



Before ingesting data, it is important that you create a configuration tailored to your content format and structure.

7. To create a new configuration, click on “select documents” button, locate the Chase PDF document and the PPT shared for this Lab, and click “Choose” to ingest the two.

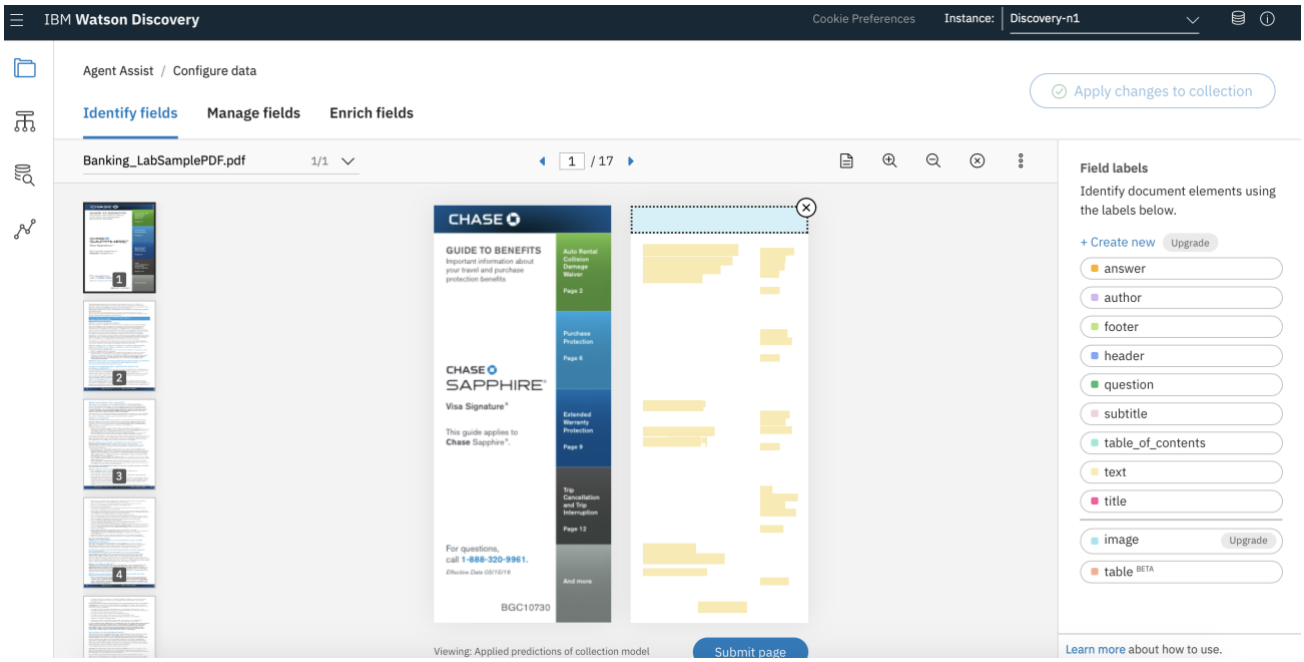
8. Once ingestion begins, you can click on “Configure Data” in the top right hand corner. You are now ready to build your Configuration pipeline.

2.1 Using Smart Document Understanding to identify, manage, and enrich fields within your index

In the “Configure Data” windows, you have access to Smart Document Understanding (SDU) capabilities which allows Watson Discovery to visually learn the structure of documents. It allows you to train on examples of the document structure, and then apply the model to more data, to take something like a pdf and extract structure and meaning. This becomes extremely valuable when trying to create well-formatted, metadata-rich answers.

Familiarize yourself with this window:

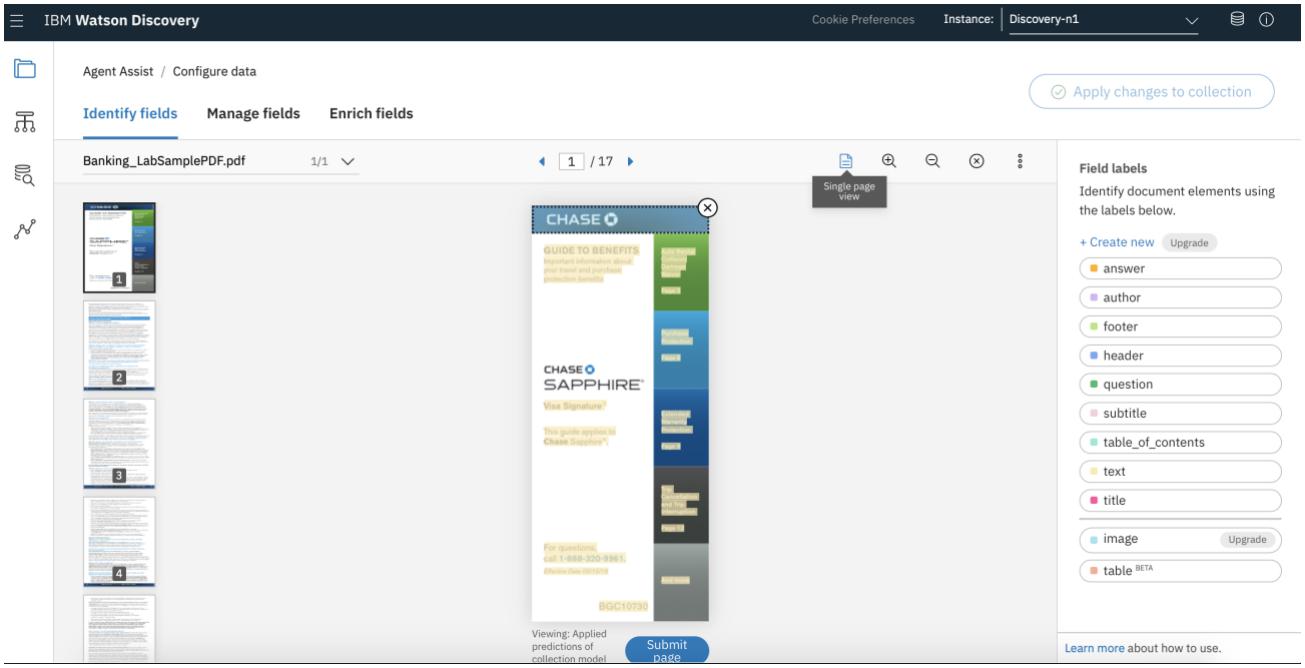
- On the right are “Labels” these are the tags that you can assign to different parts of the document. (Note this is training on the structure, so it ignores the words on the page).
- In the center you see a view of the original PDF and a view with each section block highlighted, this is where you can make annotations by selecting a label and then a block
- On the left are all the pages of the document.
- For each page, SDU will show a preview of what the model thinks the content should contain, as you add annotations, you will see these predictions update for future pages.



2.1.1 Identify Fields

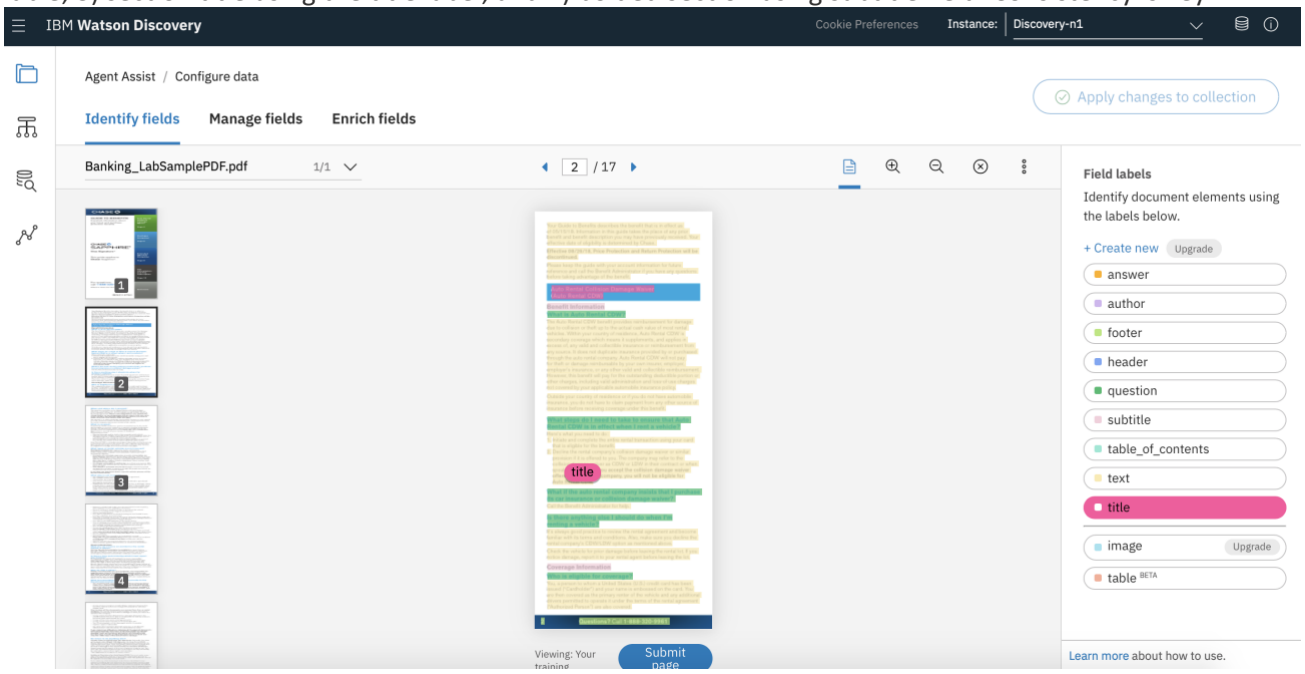
Make sure the Banking_LabSamplePDF is selected in the drop-down menu.

1. Notice that Watson Discovery is automatically converting the PDF content into text form. Click on the “page” icon to overlay the text extraction view with the original PDF.



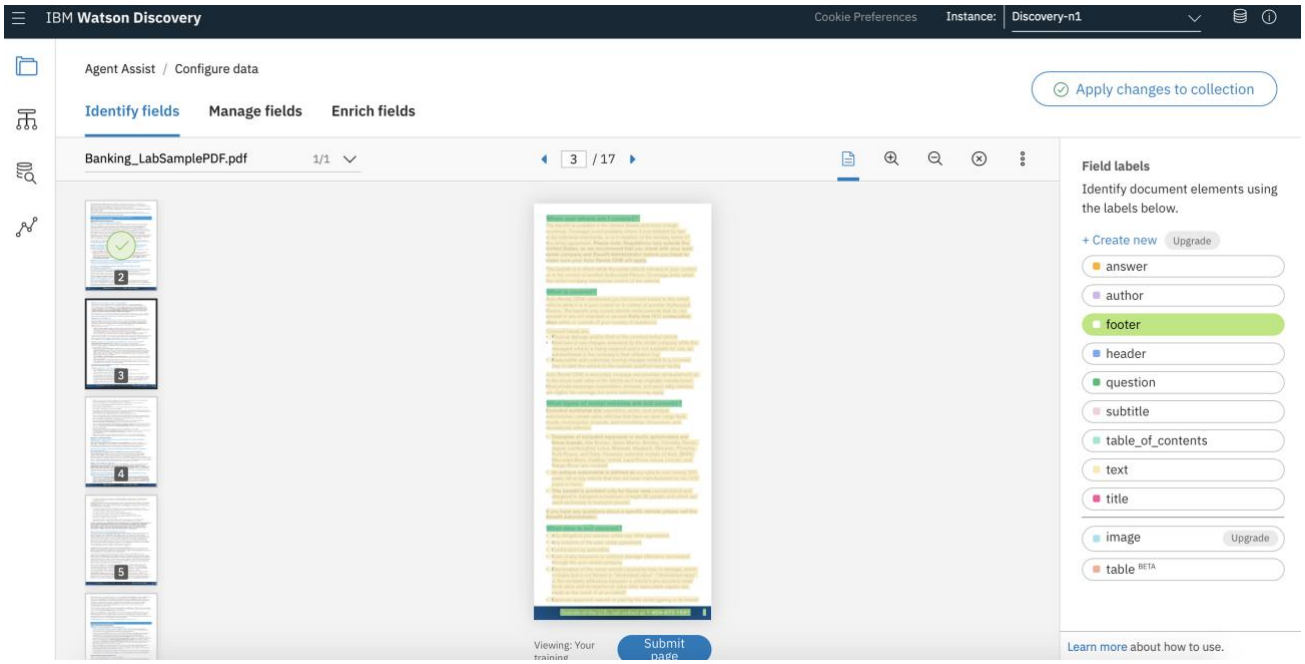
Let's disregard the title page as it is somewhat unique. Starting on page two, you can see the structure of the document. It has a Title section in blue and then a number of FAQs as subtitles. So we can use the labels to mark the document as such. There is also a consistent footer on every page, we want to identify that footer so we can potentially remove it.

2. Use the labels on the right to highlight 1) questions using the question label; 2) footers using the footer lable; 3) section title using the title label; and 4) bolded section using subtitle field. Consistency is key.

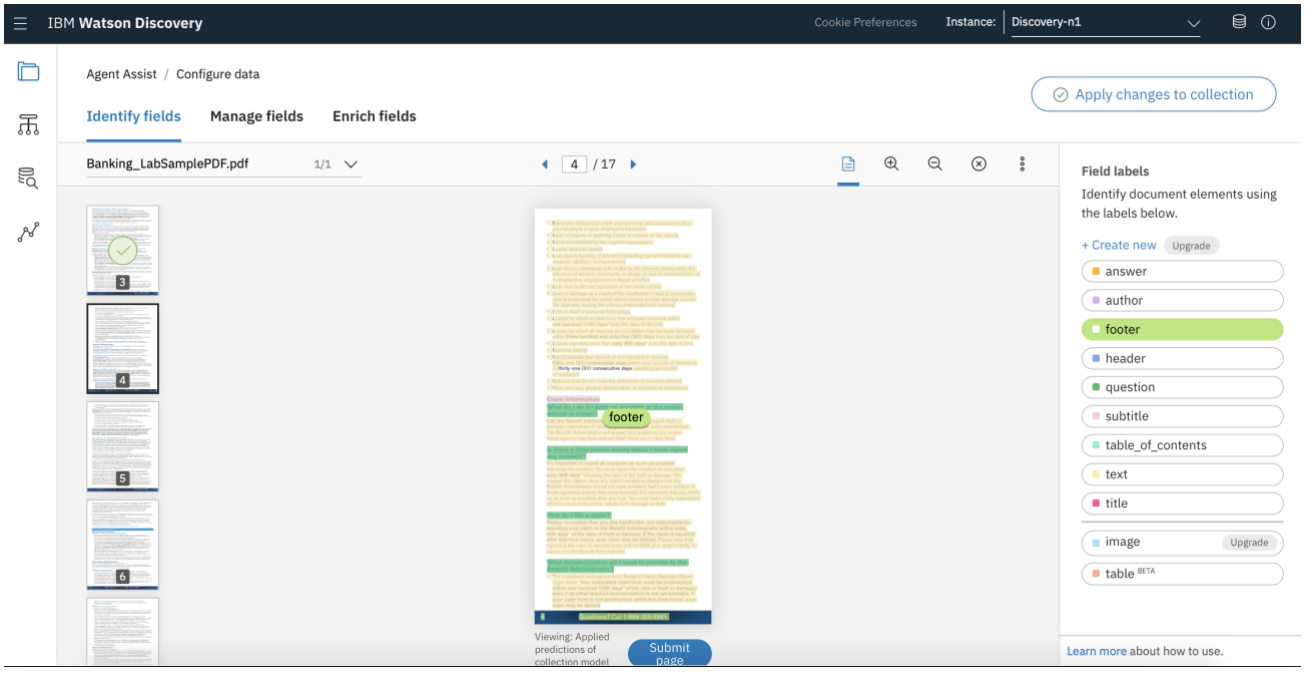


3. Click on Submit page to submit the training. The tool now moves to Page 3.

4. On Page 3, the Smart Document Understanding model is already trying to apply its learnings although no results are shown. The model needs more training data. Let's go ahead and provide more training input. Highlight question and footer fields as shown below.



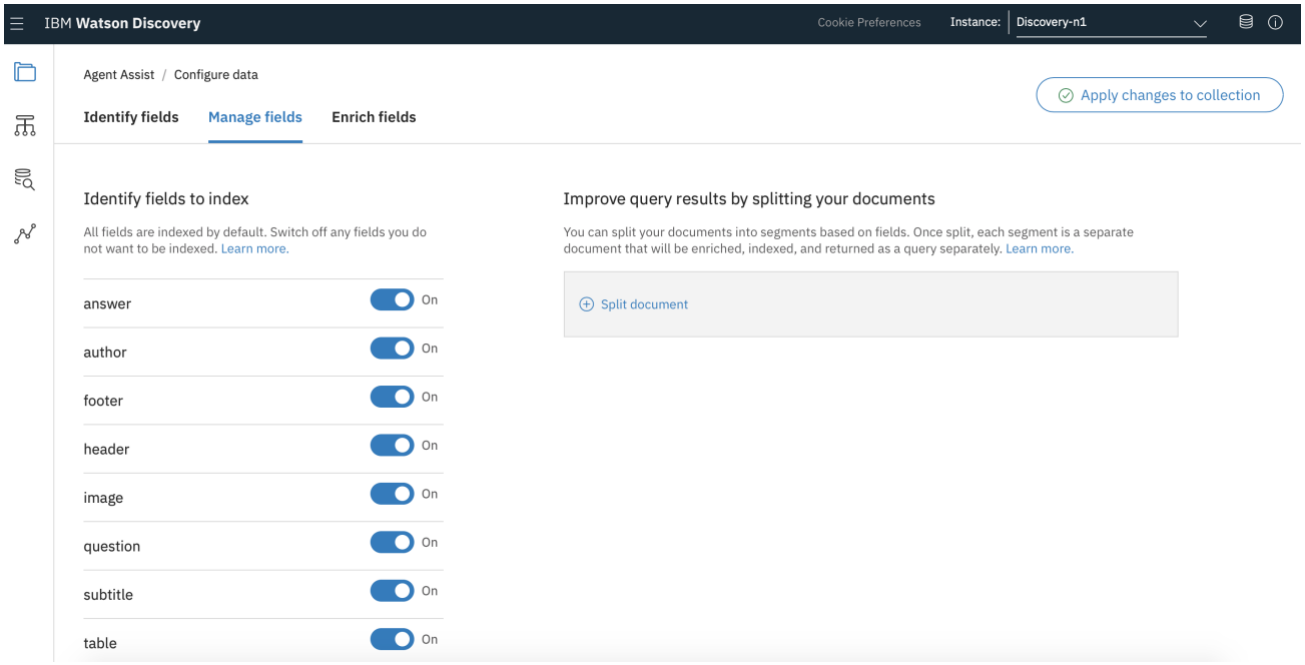
5. Click on Submit page. The tool will now move to Page 4. Notice that the Smart Document Understanding model has already applied its predictions based on what it has learnt so far. We are now getting good results!



6. Go ahead and click on Submit Page to provide one more training input. When you move to Page 5 you will notice we are still missing the Footer. Highlight the footer using footer label and Submit Page 5.

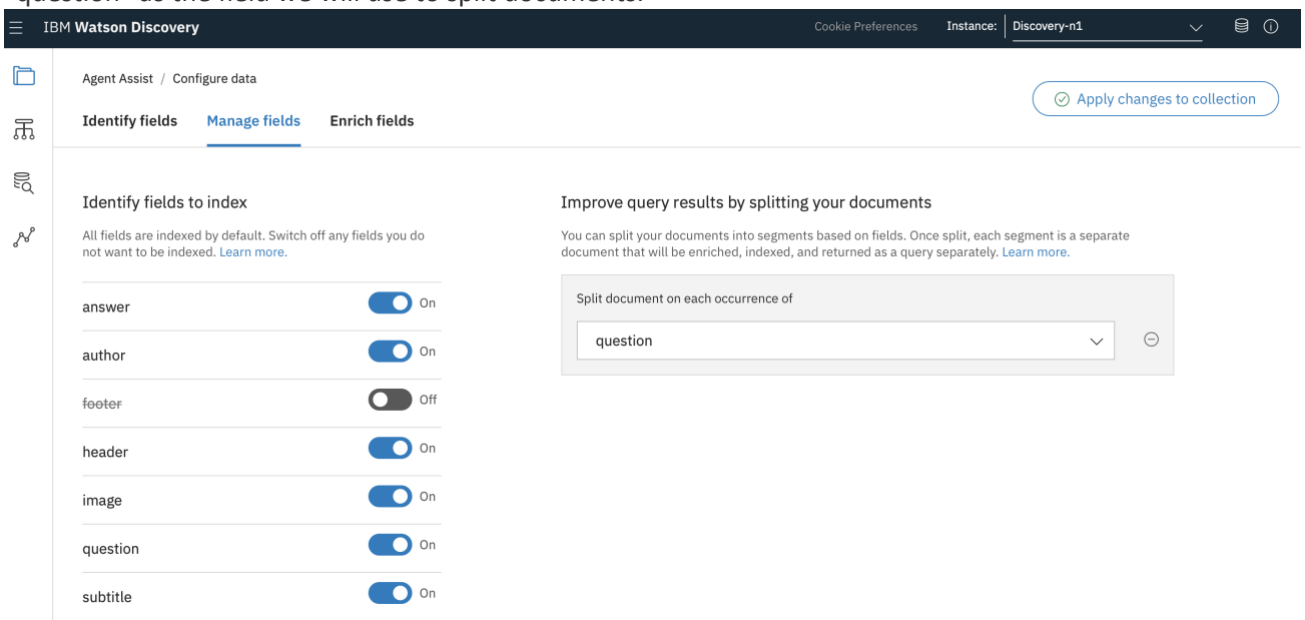
2.1.2 Manage Fields

After training the visual Smart Document Understanding model, you will need to define how Watson Discovery should manage the fields highlighted within your documents. Each label will appear as a separate field for the doc in Discovery.



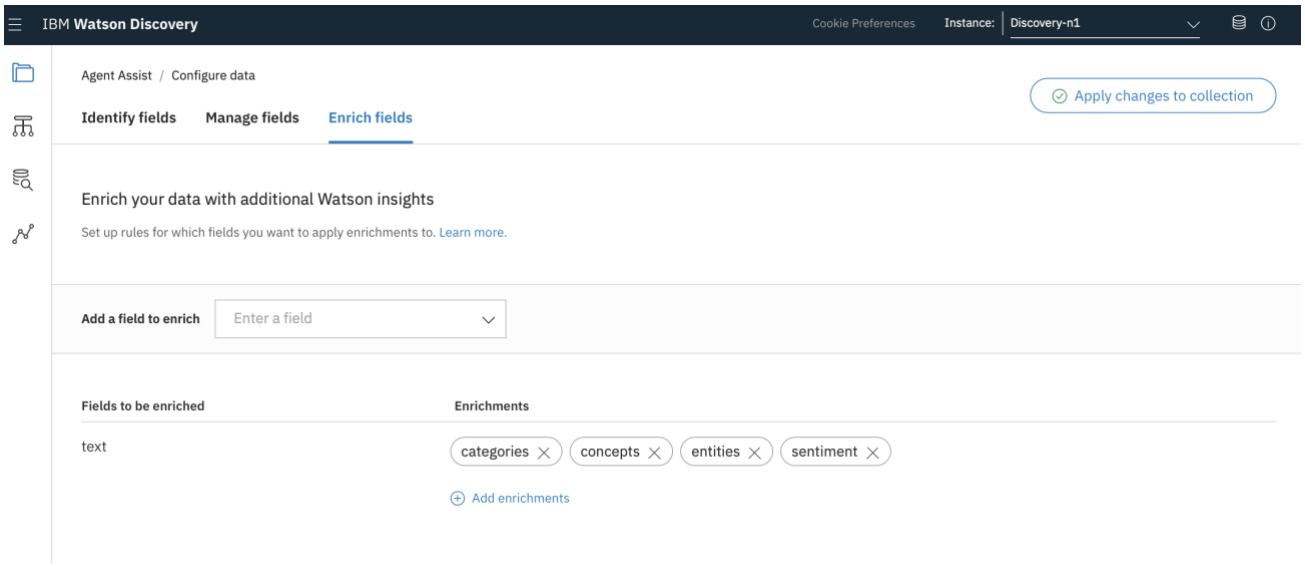
1. Click on the Manage Fields button.

2. Turn off the Footer field to avoid it being indexed (in this way we can keep the index “clean”). Then select “question” as the field we will use to split documents.

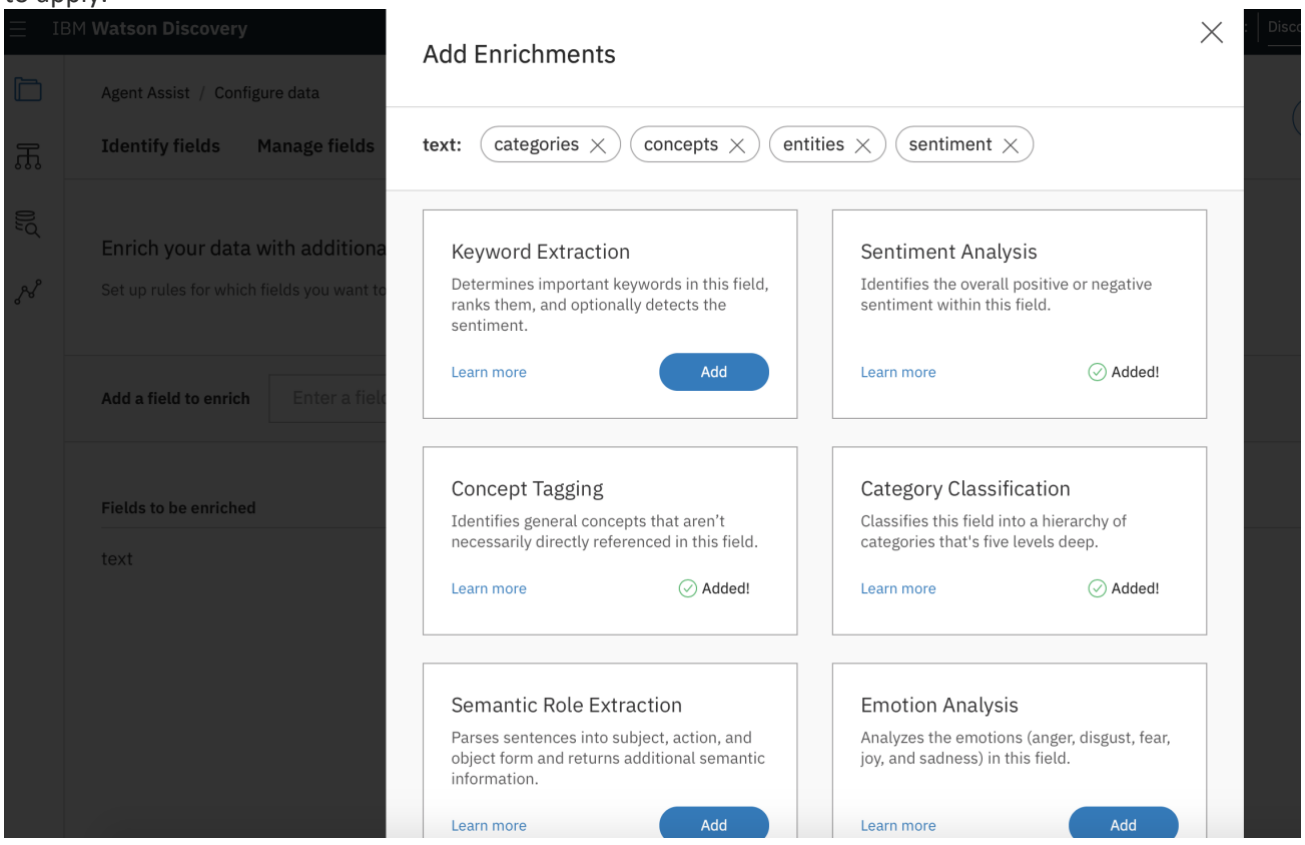


2.1.3 Enrich Fields

Watson Discovery automatically processes the ingested data through a Natural Language Processing pipeline. As the data goes through the pipeline it is tagged with relevant metadata. The metadata added to the content is what we refer to as “enrichments”. Enrichments can include relevant concepts, entities, and keywords extracted as well as the sentiment and emotion detected. The enrichments play a key role in content analytics use cases such as Voice of the Customer.

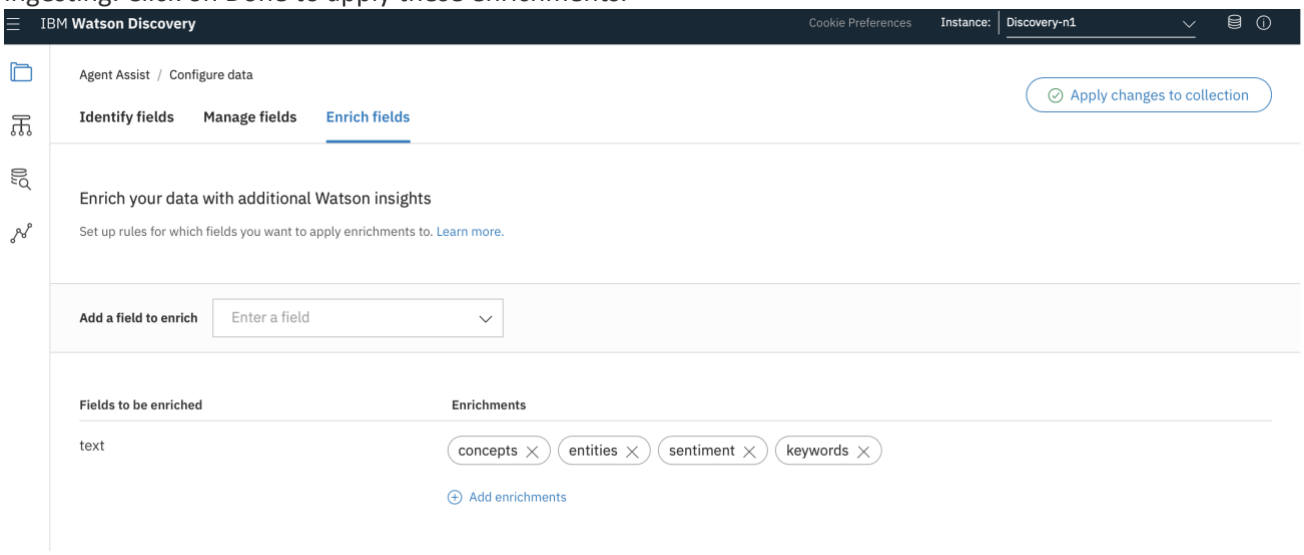


1. Click on “Add enrichments”. You will get a pop-up window allowing you to select the enrichments you want to apply.



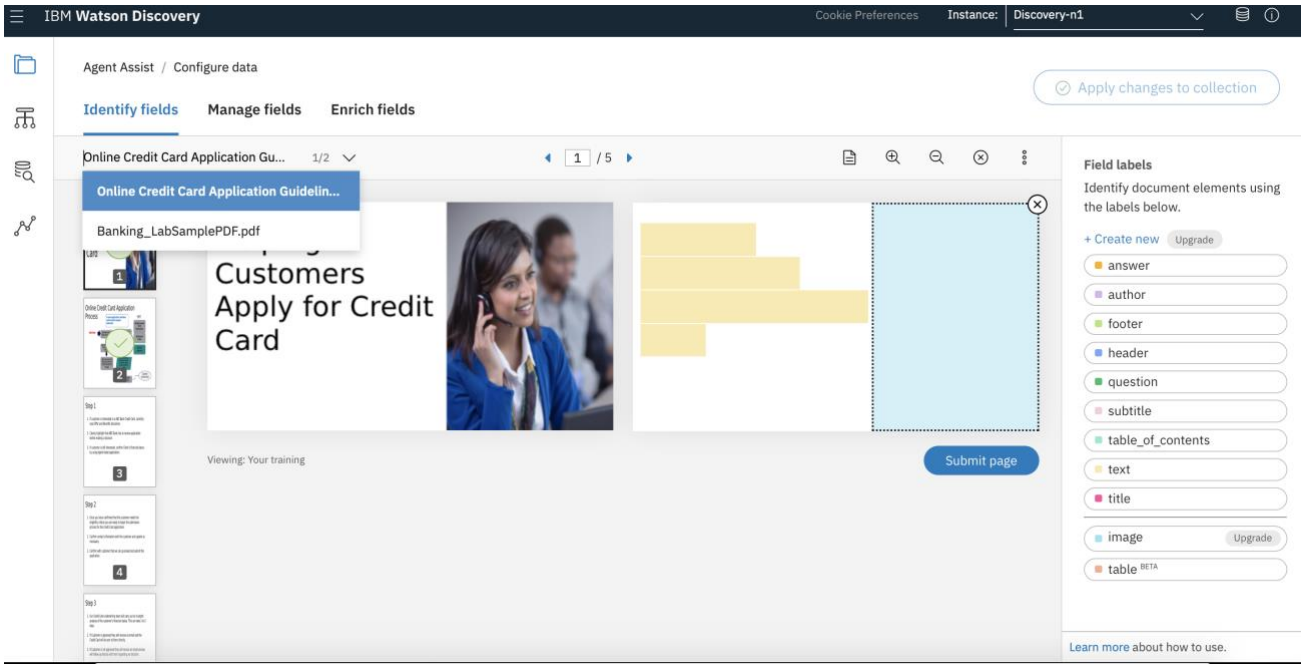
2. Remove “categories” by pressing X on the bubble.

3. Add Keyword Extraction. For the time being these are the relevant enrichments for the data we are ingesting. Click on Done to apply these enrichments.



4. Now that you've set up the configuration pipeline for the PDF file, let's make sure that it will get applied properly to the PPT as well. To do so, click on Identify fields.

5. Select the PPT file from the drop down menu



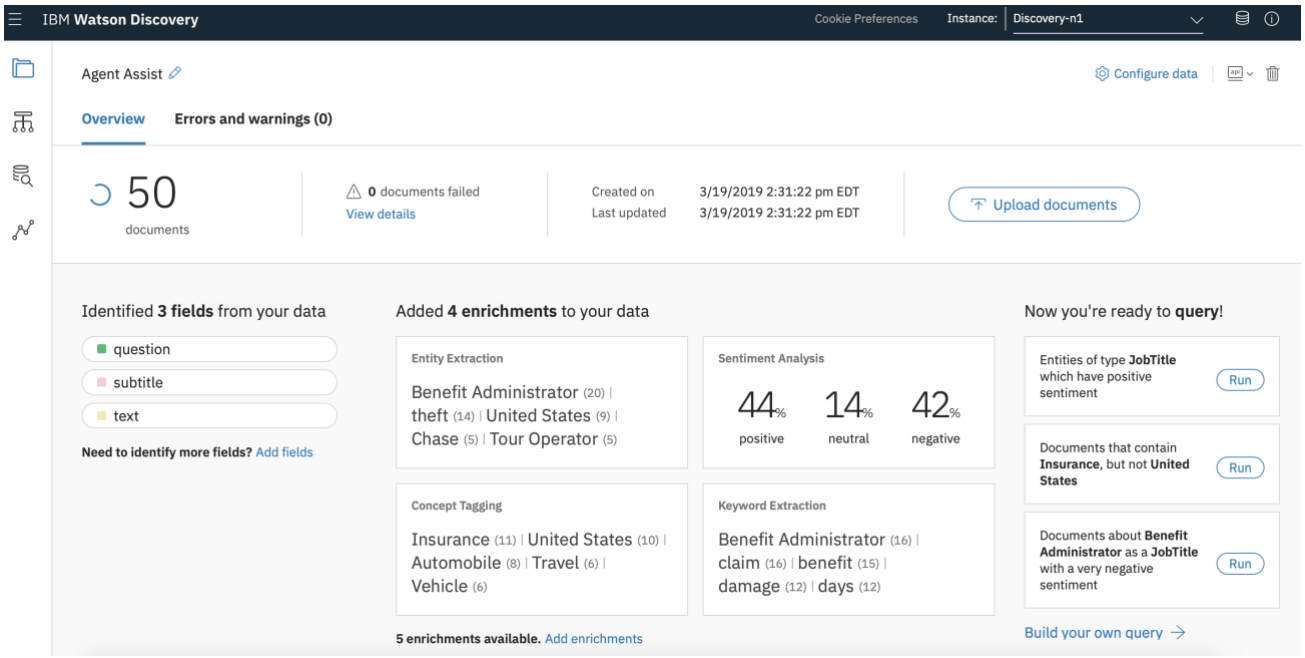
6. Notice that the "question" labels are being applied incorrectly to the PPT. That is ok – let's use the "text" label to train the model further. Click on "Text" and highlight Slide 1 content.

7. Click on Submit page to advance to Slide 2. Click on "Text" and highlight Slide 2 content.

8. Click on Submit page to advance to Slide 3 – the structure should now be correct.

9. Click "Apply changes to collection" and Choose the PDF and PPT files to re-ingest the documents and apply the new configuration pipeline we just created.

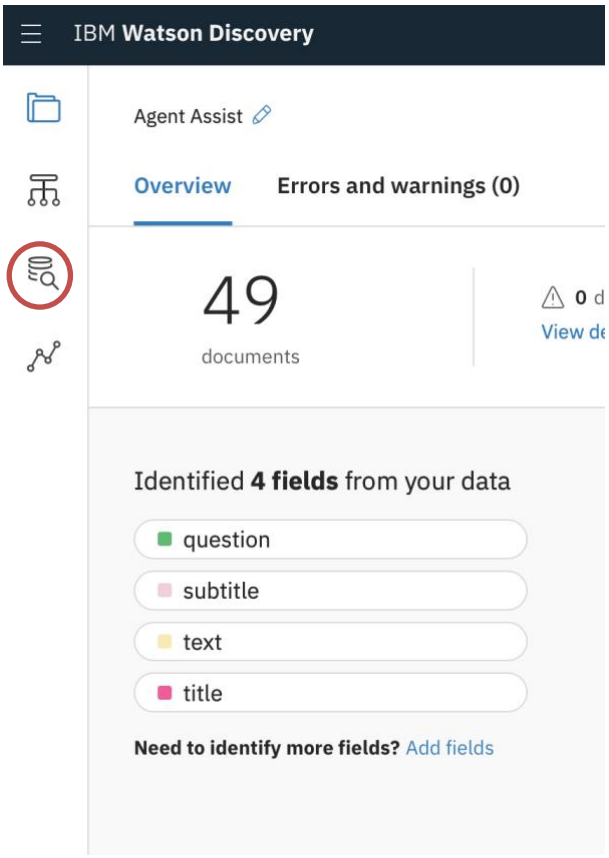
You will be directed back to the Collection landing page and you will see the ingestion process kick in and the number of documents increase. Each question/text pair is now its own document!



3 Obtaining data insights/Querying the collection

After the discovery instance is configured and data is ingested, the collection will be queried to gain insights into the data. The data schema will also be provided to gain an overall view of the collection and documents.

1. To build a query, you can either click "Build queries →" in the bottom right corner or click on the build queries icon on the lefthand side bar. Option 2 is circled in red below. If you click the icon, you will have to choose the collection you want to query which is "Agent Assist".



2. In the "Build queries" page, you can choose to "Search for documents," "Include analysis of your results," or "Filter which documents you query."

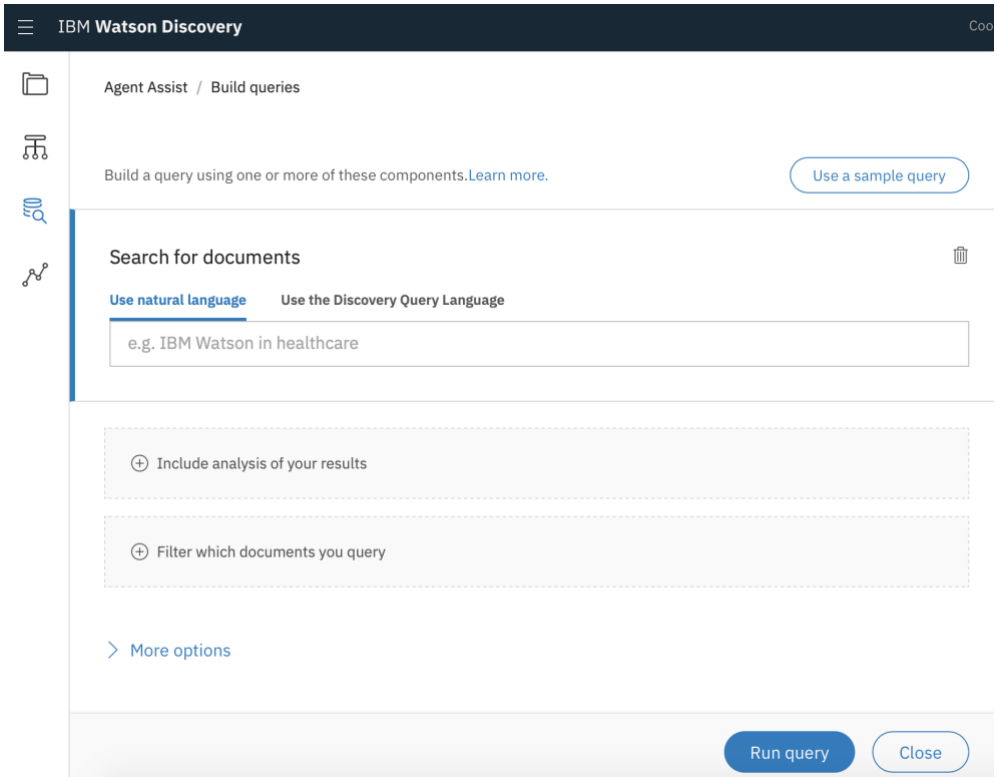
3.1 Search for Answers from Relevant Documents

In this section, we will walk through queries that an SME, Solution Admin, or developer (Tanya) would configure within the application in order to gain insight from the data. The application end user for this first use case is Henry, an ABC Bank Agent. He is responsible for assisting customers with their ABC bank products and offering. In this day and age, client trust means everything. And Clients rely on Henry for timely and accurate advice. He is constantly tasked with diggingup information hidden in company policies, documents, FAQs in order to provide the best recommendations to clients. In a study of how agents spend their time, we found that agents spend up to 35% of their days searching for information from a knowledge base or CRM. Additionaly Customer service agents use dozens of disconnected applications in the course of resolving a single customer issue, often duplicating data from application to application or performing

repetitive, manual tasks —actions that take up 15% of an agent's day.There's a lot of pressure to provide quality answers to his Clients in little time. He begins his day by accessing the Watson Agent Assist app just in time as customer inquiries start coming in.

The Discovery application provides Tanya an option to build their own customer query and execute them. The query results will be shown in the right window of "Build your own query" page.

1. Click on "Search for documents". Ensure "Use natural language" is underlined.

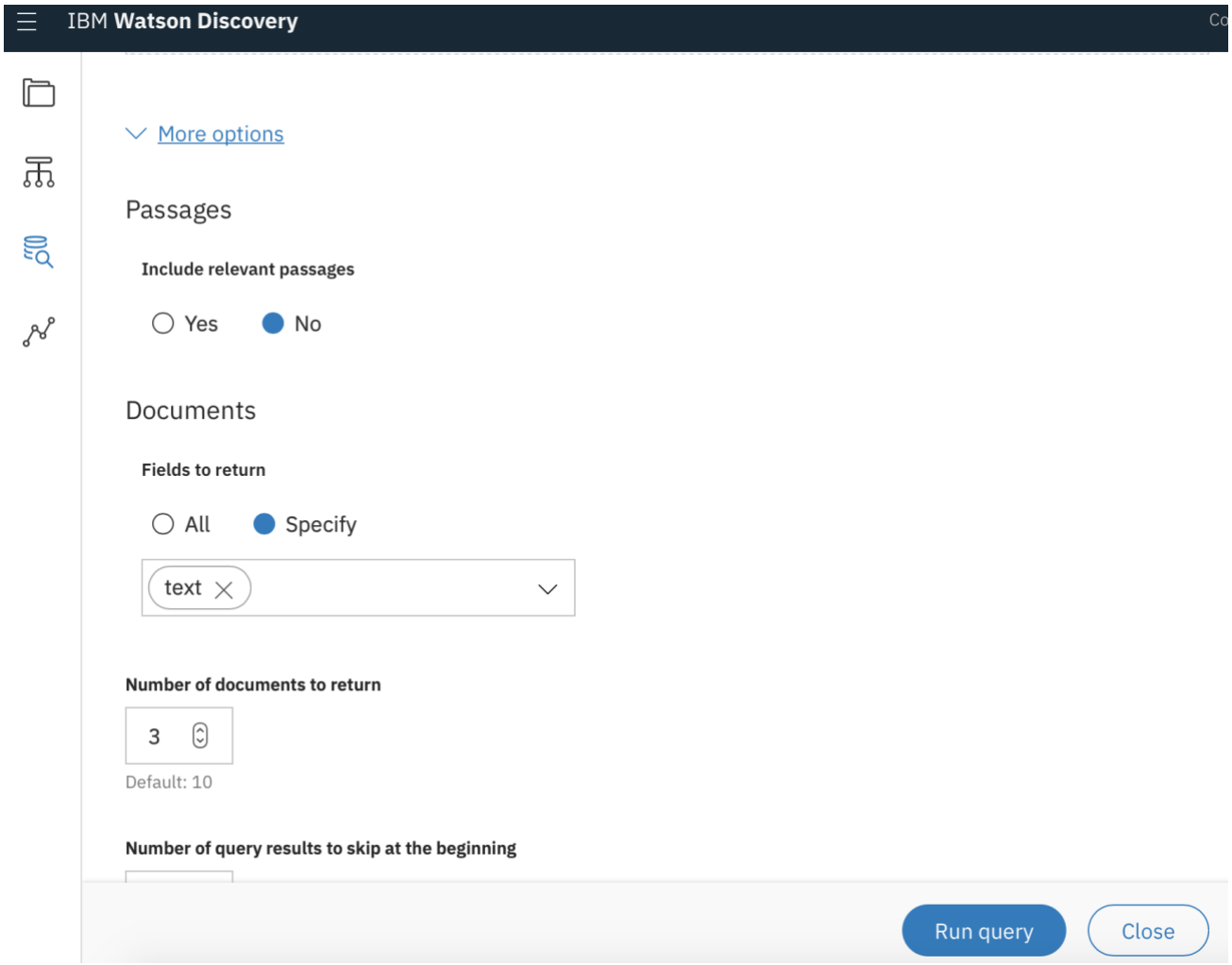


2. Type "does auto rental coverage apply in other countries" and click Run Query.
   By default Watson Discovery will return relevant passages AND documents that pertain to the query. The next step is to fine tune the queries to get even better results.

3. Click "More Options" to explore more advanced querying techniques.

4. Under Passages, click No to turn off Passages.

5. Under Documents, click Specify and select the "text" field. Also update the Number of documents to return and set it to 3.



We are building a query that leverages the smart structure we built using Smart Document Understanding. We want the query to return only the "text" field (not the questions), and we want to showcase the top 3 results back to the user.

6. Click Run Query and then click JSON to see the results.

You will notice that the relevant document is now being shown in second position. The answer returned contains the full text (not just a snippet) – which is exactly what an end user needs to answer that question.

4 Relevancy Training

During this lab exercise, we have facilitated the configuration steps by providing you with sample content data and example queries. In this section, we will go over how you can improve your answer results by training the model. Relevancy training (RT) is optional; if the results of your queries meet your needs, no further training is necessary. In cases with realy hard questions to answer where there a lot of possible documents linked to queries, relevancy training is most useful. Relevancy training can be done programatically or in the tooling. In this section, we will show you how to train the model in the tooling.

4.1 Overview and Requirements

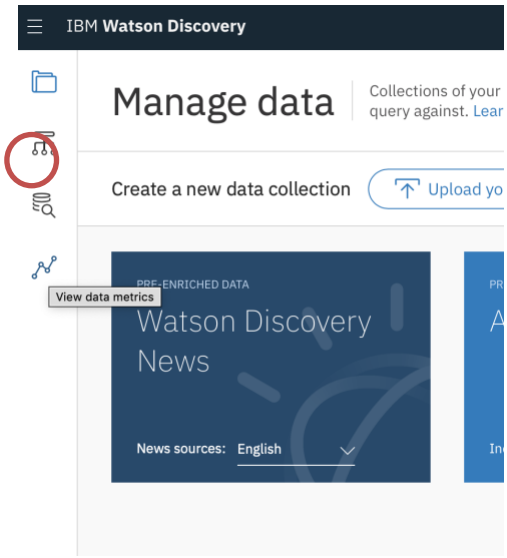
The relevance of natural language query results can be improved in Watson Discovery service with training. In order to train Watson, you'll need to provide example queries that are representative of queries your user enters and provide ratings to say which results for each query are relevant and not relevant. The requirements for Discovery to begin applying your ratings include training a minimum of 49 queries or possibly more (Watson will give you feedback if it needs more queries in order to train) and applying both Relevant and Not relevant ratings. Only rating Relevant documents will not provide the data needed.

In this section, we will only train two example queries to show the training process flow. In real life instances, a minimum of 49 queries must be trained for Discovery to begin applying rating.

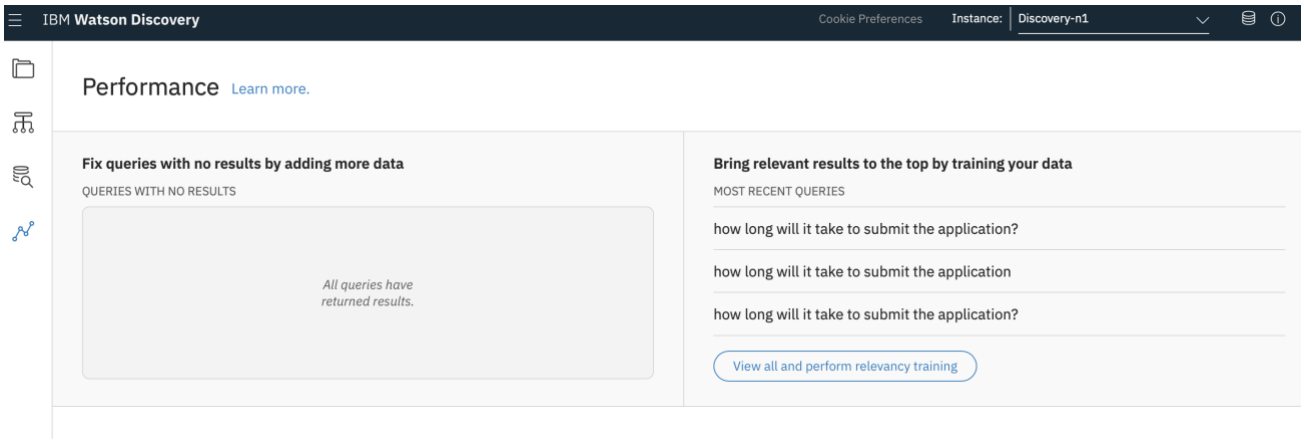
4.1.1 Train Watson to Improve Results

We will train the results for the query "does auto rental coverage apply in other countries" to help the model rank the right answer to be more reelvant. Remember to rate them with both Relevant and Not relevant.

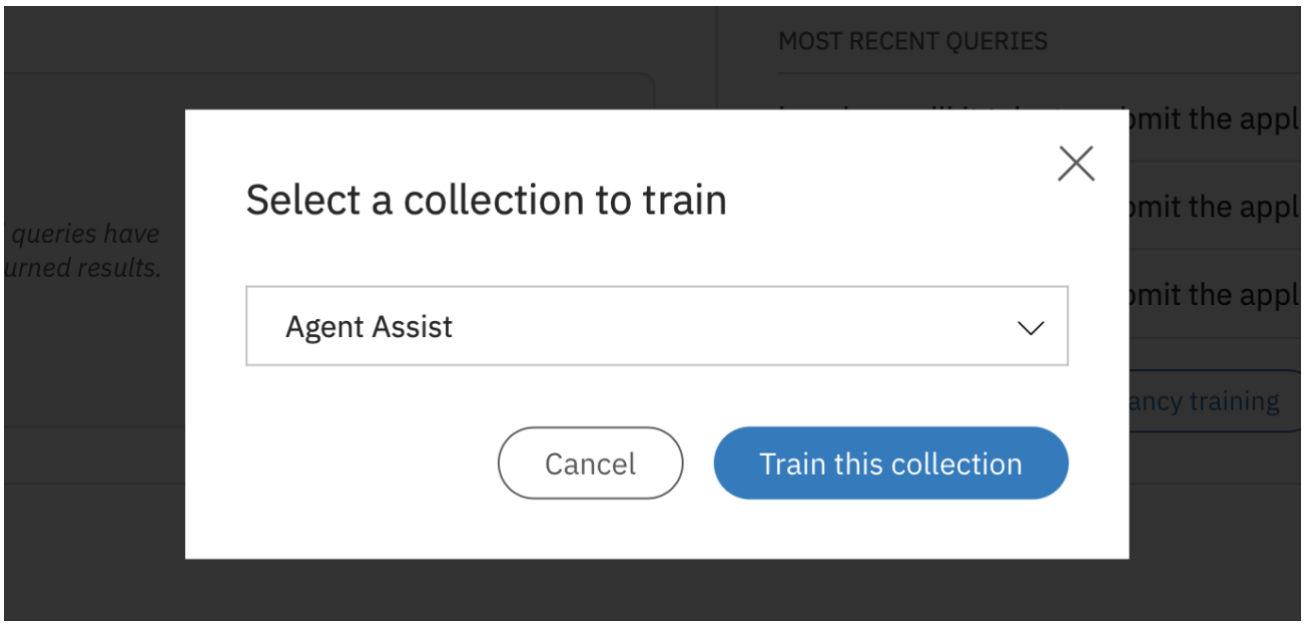
1. In order to train your model, start by reviewing the logs. To do so, click the "View Data Metrics" icon on the lefthand side bar.



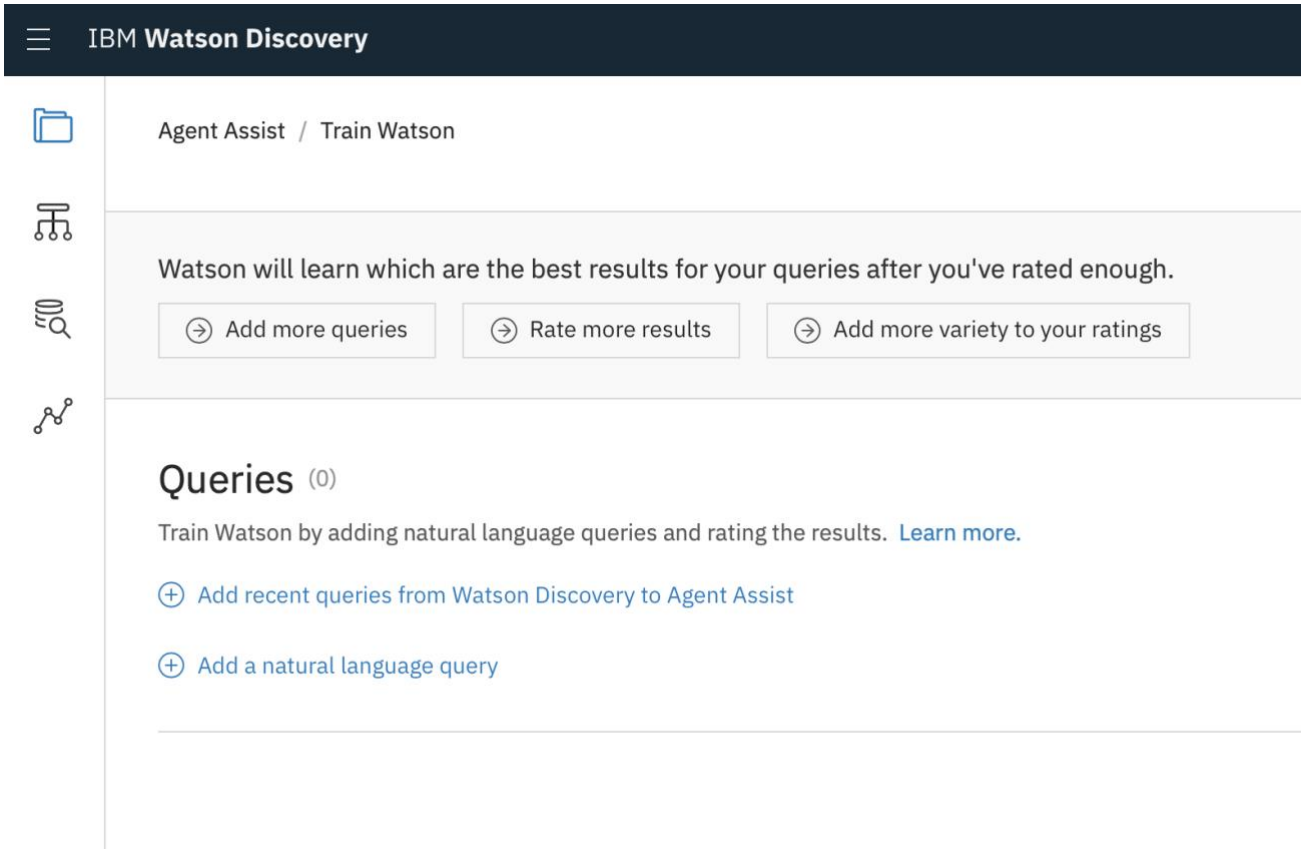
2. Choose "View all and perform relevancy training" to take the latest queries and perform Relevancy Training.



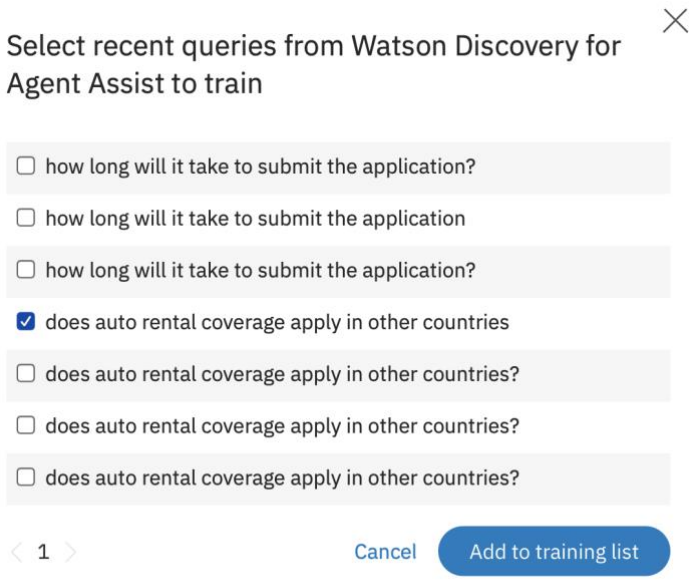
3. Choose “Agent Assist” as the collection that you want to train. Then click “Train this collection”



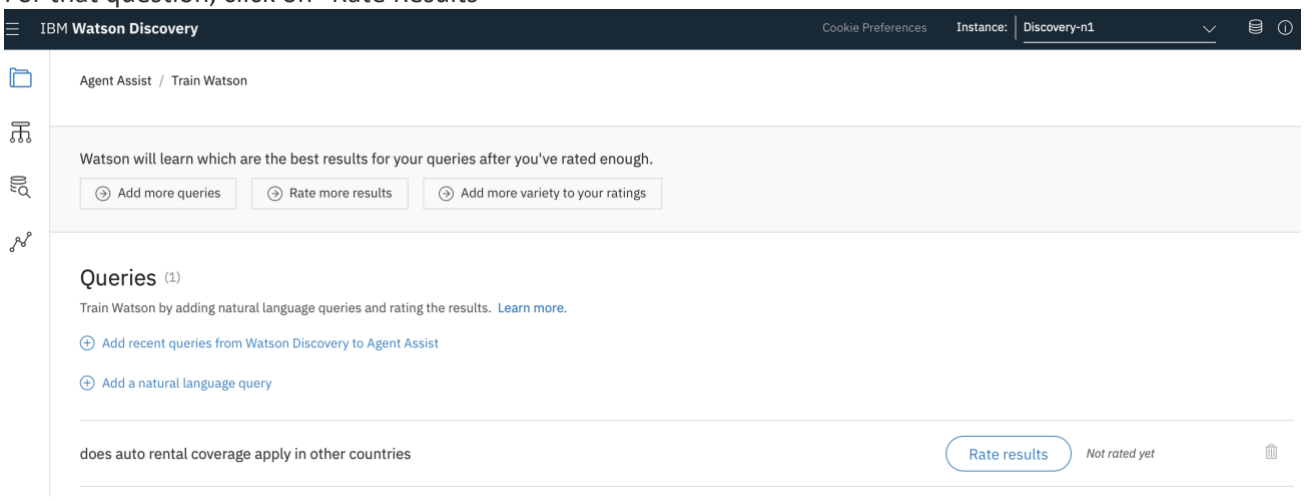
4. Now click “Add recent queries from Watson Discovery to Agent Assist”



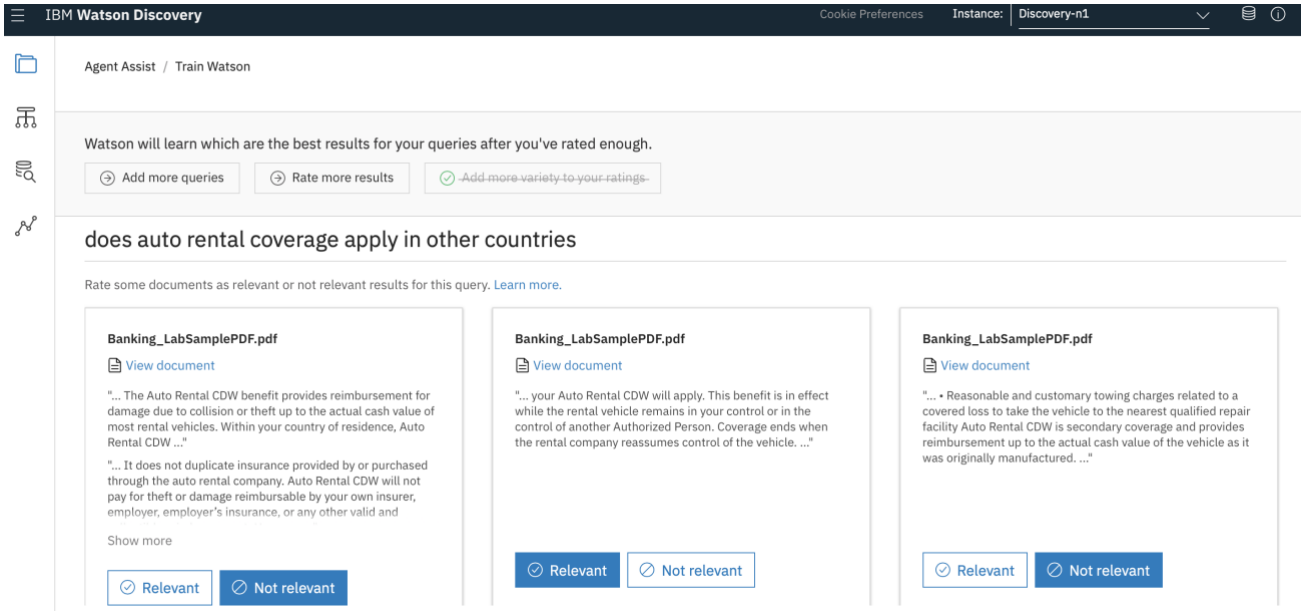
5. Select “does auto rental coverage apply in other countries ” and click on “Add to training List”. Then exit the small window.



6. For that question, click on “Rate Results



7. Rate “Not Relevant” or “Relevant” based on the answers returned.



As mentioned previously, one example is not sufficient to update the Relevancy model. You will need a minimum of 50 questions to answer mapping. This exercise, if conducted by SMEs, usually takes 30-60 minutes and can significantly improve the Watson Discovery Results.