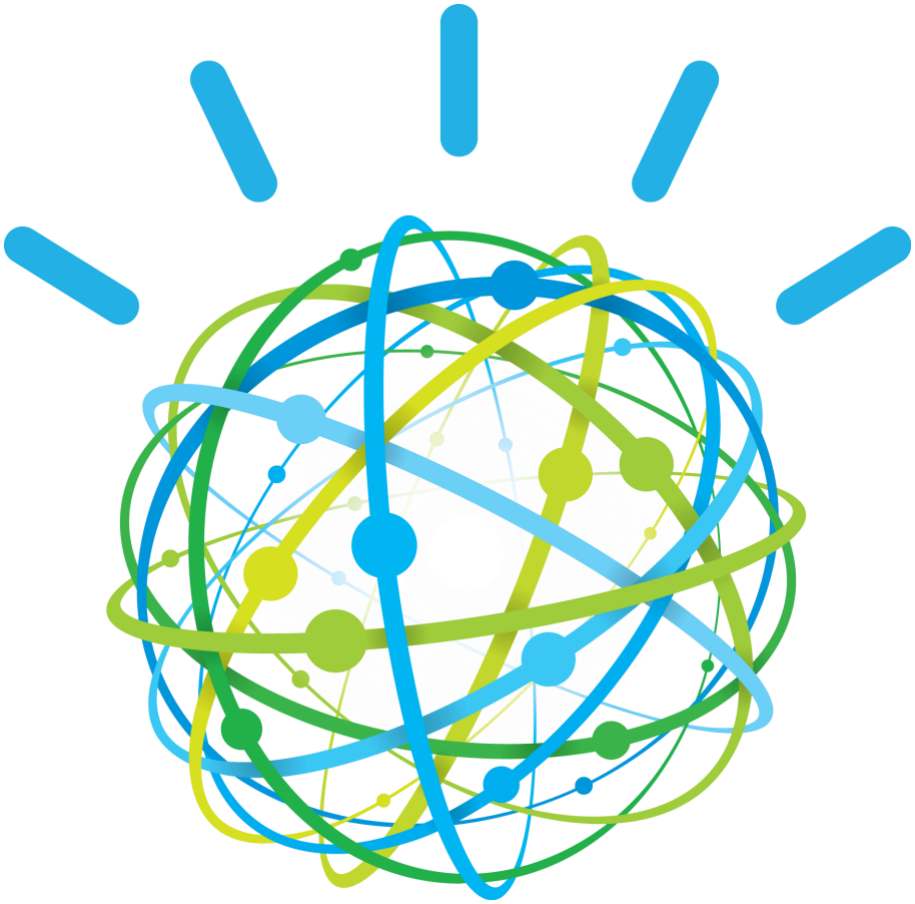
Session 8: Implementing

IBM Watson Assistant



Lab Instructions

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Content

Let’s get started

1. Overview

The IBM Watson Developer Cloud (WDC) offers a variety of services for developing cognitive applications. Each Watson service provides a Representational State Transfer (REST) Application Programming Interface (API) for interacting with the service. Some services, such as the Speech to Text service, provide additional interfaces.

The Watson Assistant service combines several cognitive techniques to help you build and train a bot - defining intents and entities and crafting dialog to simulate conversation. The system can then be further refined with supplementary technologies to make the system more human-like or to give it a higher chance of returning the right answer. Watson Conversation allows you to deploy a range of bots via many channels, from simple, narrowly focused bots to much more sophisticated, full-blown virtual agents across mobile devices, messaging platforms like Slack, or even through a physical robot.

The **illustrating screenshots** provided in this lab guide could be slightly different from what you see in the Watson Assistant service interface that you are using. If there are colour or wording differences, it is because there have been updates to the service since the lab guide was created.

2. Objectives

you will learn all aspects of performing the steps required for a successful domain adaptation with Watson Assistant service.

The tasks and tools that are covered will allow you to perform the steps necessary to efficiently and effectively build and refine Ground Truth and to set up a Watson Conversation Service solution.

3. Prerequisites

During this lab exercise, you will modify an Excel spreadsheet to organize and manage collected questions. If you do not have Excel, you may use another spreadsheet application that is on your computer, but all lab guide instructions are based on Excel software.

The instructor provided you the link to get labs content. You may download each file individually.

Bluemix URLs per location:

Location	URL
US	https://console.ng.bluemix.net/
UK	https://console.eu-gb.bluemix.net/
Sidney	https://console.au-syd.bluemix.net/
Germany	https://console.eu-de.bluemix.net/

4. What to expect when you are done

At the end of session, you should have the right understanding of the steps required to create :

Your Ground Truth

Your training set

Your test set

And to run test and assess your Ground Truth

Prerequisite validation

5. User scenario

Before starting your domain adaptation, you will work with the client to define the implantation's end-users, to identify the use cases, and to agree on the success criteria for the WCS solution. Take all of the steps necessary to ensure that the solution the client is building will benefit the end-user community as intended.

Some reminders:

User scenario: A hotel concierge virtual assistant that is accessed via a screen in the hotel lobby or in the room.
End-users*:* Hotel customers
Context*:* Customer name and all other information for a fluid conversation
Success: reduce time to get advices, recommendations, release concierge availability

6. environment

The virtual assistant must be able to provide information about hotel amenities and restaurant around the hotel. And should be accessible via a kiosk in a lobby and a device in a room (screen…).

Example: https://www.youtube.com/watch?v=jC0I08qt5VU

Potential hotel amenities: pool, fitness center, wellness center, restaurant (French, Italian), bar

Question collection

The initial step in the domain adaptation is to collect end-user representative questions. End-user representative questions are questions that the end-user asks the production system. In a WA implementation, end-user questions are used to train and test the system to prepare for production.

In a real-life question collection scenario, the user experience should mimic the final user experience as closely as possible. Production elements to focus on are:

- The device that will be used to interact with WA.
- The look and feel of the user interface.
- The steps users take before asking a question (greeting and beginning of conversation).
- Any available information that will be a part of the end-user experience (for example, information on the screen).

The more accurately you emulate the production environment and experience, the better the representative questions will be and the easier it will be to train the system.

Note: If the questions that are collected during question collection are not representative of the questions that users ask in production, or if the user experience changes before production, any work that has been done with intents, entities, dialog, or performance optimization may be negated.

7. Question collection

We cannot simulate the question collection, but you will work, in the class room, on specific examples and on the creation of questions.

- It is the process of collecting questions / inputs that represent the user scenario
- Collect a minimum of 10 representative questions for each unique intent (5 is the minimum in WCS) for example, WCS production offering is 200 intents, requiring 2000 representative questions.
- All questions will be used in the training data, and / or for blind or test sets.
- It is an important success factor for WCS because it learns from collected questions

Ground Truth

You will modify a spreadsheet to organize end-user examples after intents and entities have been determined. If you do not have Excel, you may use another spreadsheet application that is on your computer, but all lab guide instructions are based on Microsoft Excel software.

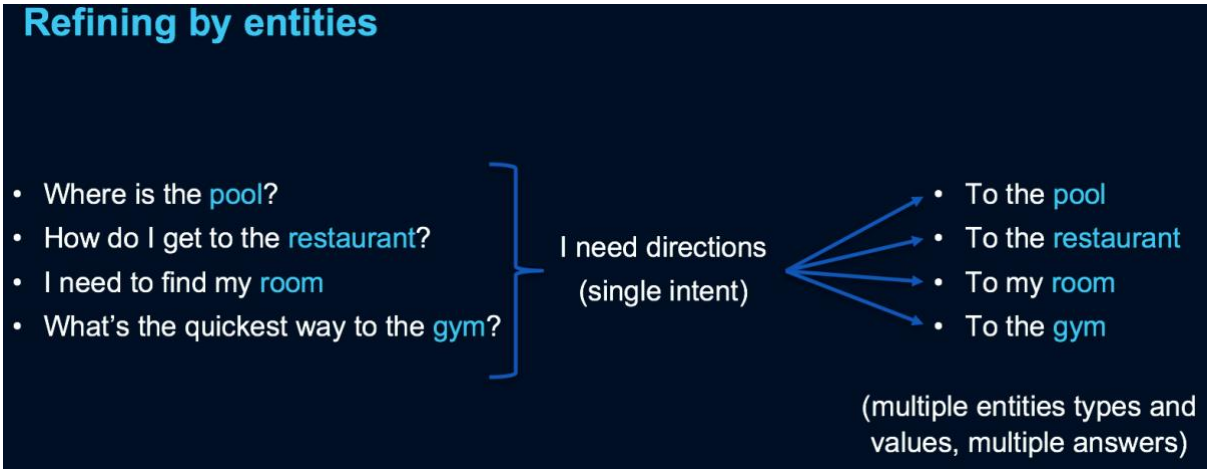
The document used for the lab guide use case could be based on core intents. In class, we teach two methods to naming intents, core intents and full intents. In your lab guide documents, there is a spreadsheet document named WCS_Lab_questions.xlsx. This document is available as an example for how this Ground Truth would be created and managed.

8. Clustering questions to intent and identify entities

To speed up the lab, a list of questions is provided and available in the provided IBM Box.

1. Upload the WCS_Lab_questions.xlsx .
2. Open the file and go to the first tab **Questions**
3. You are going to work in a group, let's start reading the 185 collected questions to determine the potential intents and entities.
4. List the potential Core Intents, you should get around 15 intents.
5. Start clustering your questions by filling the spreadsheet. Populate intent, entity and value if applicable like defined in the following example.

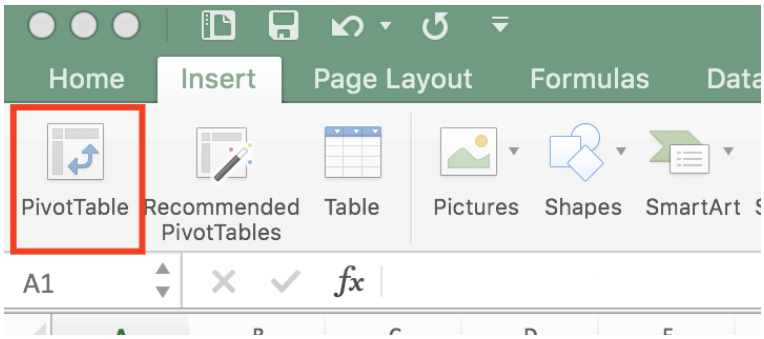
	B	D	E	F	G
	example	Intent	Entity Name	Entity Value	Column1
	Where is the restaurant?	hotel_locations	hotel_amenity	hotel restaurant	
	Where is the gym/fitness center				



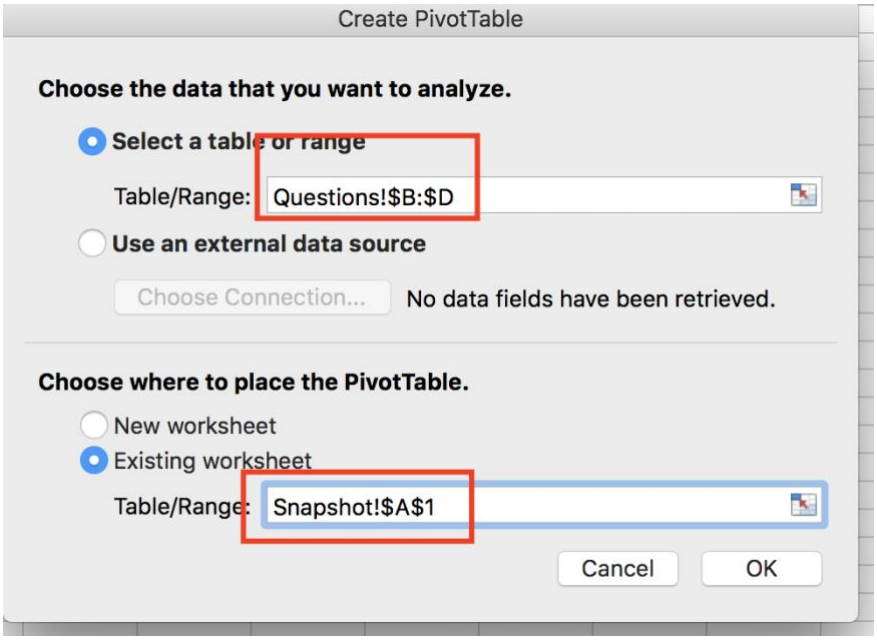
9. Analyse clustering questions to intent (optional)

One of the method to analyse the ground truth is to use a pivot table in Excel. This section will walk you through how to create a pivot table using the **Snapshot** worksheet in the WCS_Lab_questions.xls document.

1. Click on the *Question* worksheet in the WCS_Lab_questions.xlsx spreadsheet.
2. Select the Column *example* and *intent*
3. Click on the Insert tab

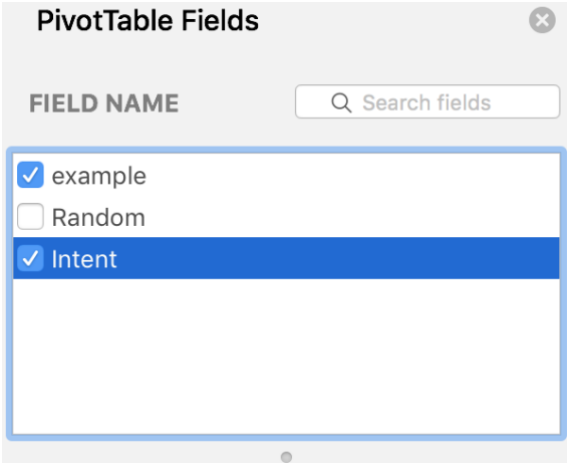


4. Click on **PivotTable**
5. In the Create PivotTable window, in the **Select a table or range frame** keep the selected table *Questions!$B:$D*
6. In **Choose where to place the PivotTable** frame, Select the first cell of Snapshot spreadsheet

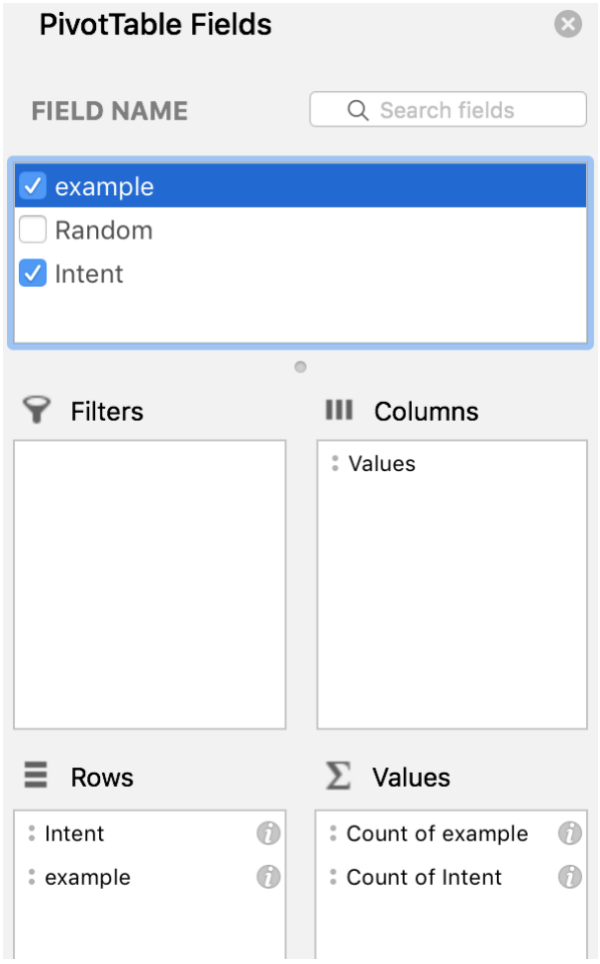


7. Click **OK**

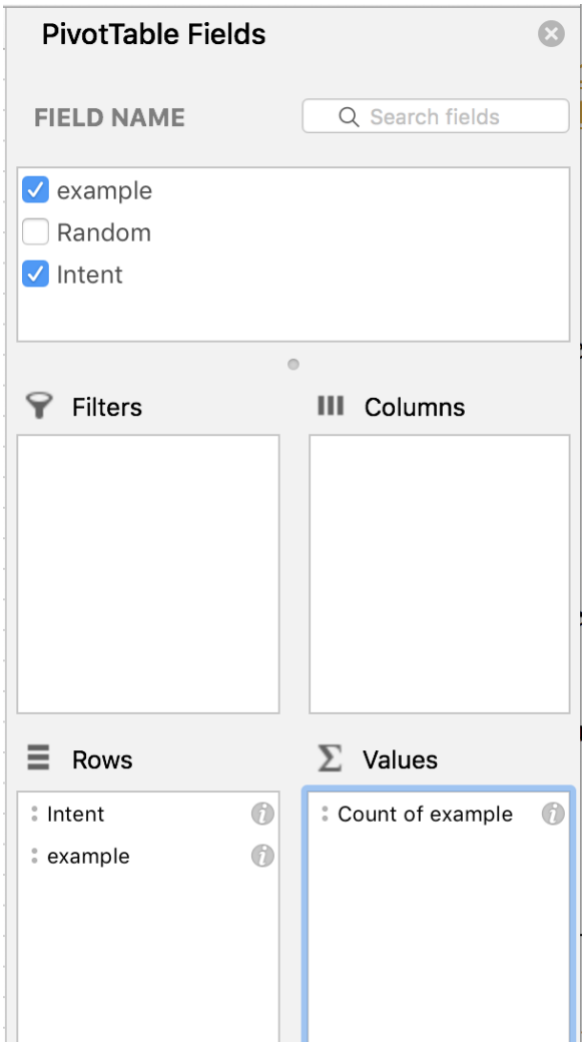
8. In the PivotTable Builder popup window, select *example* and *Intent*.



9. In the Rows field, make sure that *Intent* comes before *example* in the list. If *Intent* does not show up in the list, simply click on the Field Name that you checked then drag and drop it into the Rows field. You can drag and drop the field names to change their order.



10. If *count of Intent* shows up in the Values field, click on it to highlight it, right click, and click on **remove field**.
11. If required, click *example* in the Field Name field. Drag *example* into the Values field. It will now show up in the Values field as Count of Text Questions.



Note: Notice that you can minimize and maximize the high level intent sections of the pivot table to review all questions that have been categorized with each intent.

Row Labels	Count of Text Questions
eat	**7**
I am hungry	1
I am looking for a restaurant	1
I am starving	1
I want pasta	1
I want some food	1
I would like to eat something	1
where can I grab a hamburger?	1
exit	**6**
cancel	1
exit	1
get me out	1
get me out of here	1
I don't want to go further	1
stop the order	1
feedback	**8**
I don't think these nodes are very good - or at least they're not documented well.	1
I like the way the documentation is written	1
I love the way that the new breaking news service works!	1
I'm finding it very difficult to make any of this work	1
I'm having trouble following the instructions that are given	1
it's really horrendous how badly these nodes are documented - There is absolutely nc	1
The watson starter kit is awesome!	1
These new nodes are awesome! I love the way they are used in the new flows!	1
greeting	**5**
good afternoon	1
good evening	1
Good morning	1
Hello	1
HI	1
help	**13**
can you help me,HELP_REQUEST	1
help me HELP_REQUEST	1

Note: This worksheet can help you to review the questions related to intents and determine is the clustering is correct.

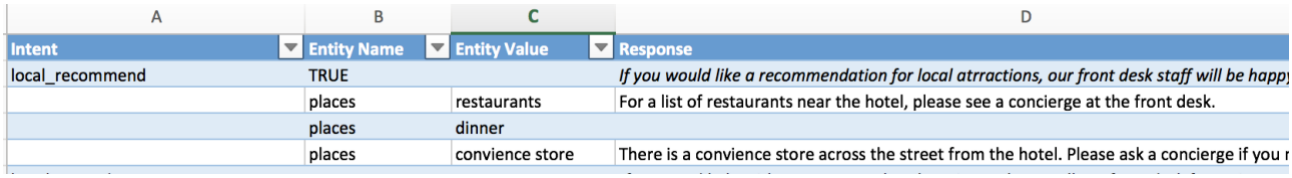
10. Answer strategy

Once you have built you ground truth, it is time to determine how you will manage the response for each intent / entity.

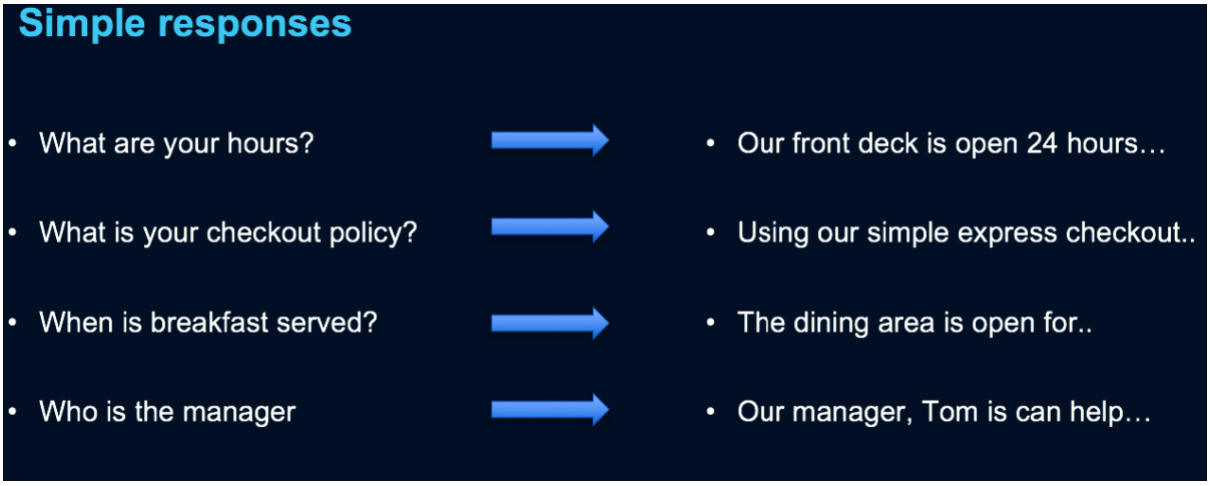
1. Go to **Responses** worksheet.

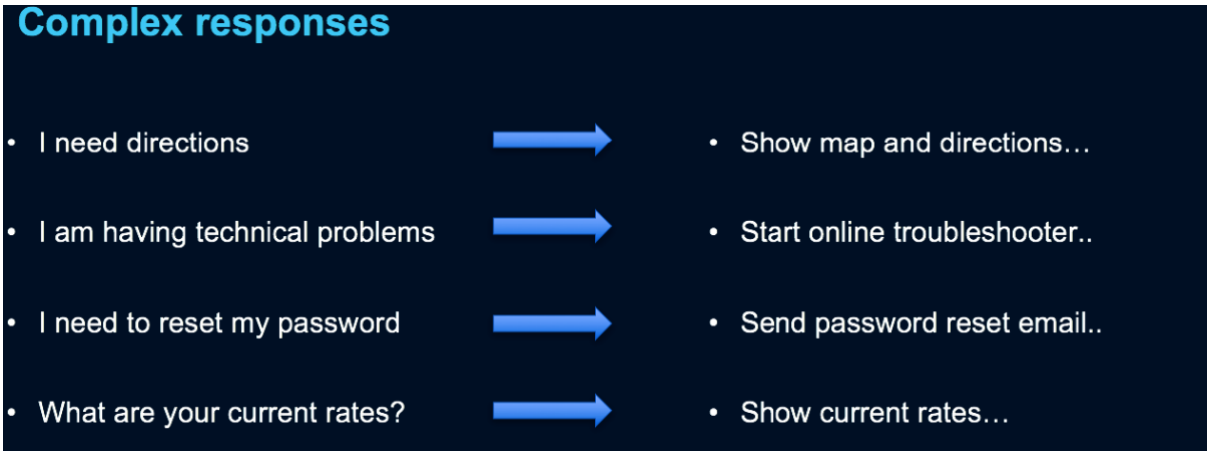
2. Write how you will manage your response.

   You should get something like below:



	A	B	C	D
	Intent	Entity Name	Entity Value	Response
	local_recommend	TRUE		*If you would like a recommendation for local atrractions, our front desk staff will be happ*
		places	restaurants	For a list of restaurants near the hotel, please see a concierge at the front desk.
		places	dinner	
		places	convience store	There is a convience store across the street from the hotel. Please ask a concierge if you





Data Set creation

Once you have collected end-user representative questions, the next step is to create question sets for training and testing.

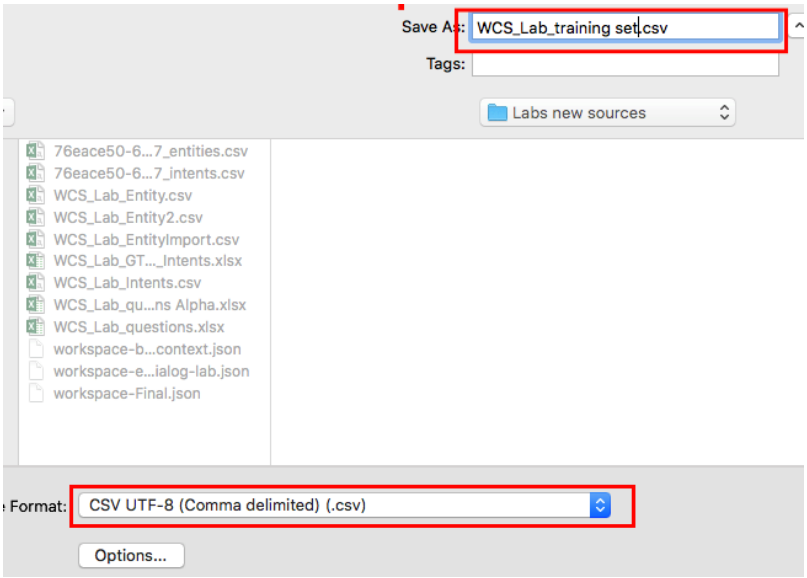
It is very important to maintain the integrity of the train and test question sets.

11. Data Set for training and testing

1. Open WCS_Lab_questions.xlsx.
2. Click on the worksheet tab named *Questions*.
3. Copy the columns example and intent

Now, you are going to prepare the csv file you are going to use to create the intents in Watson Assistant Service.

1. Create another excel workbook and paste the 2 columns
2. Click **File** and **Save as** menu
3. In the save window, change the name of the file with *WCS_Lab_Data_set.csv*
4. As format select **CSV UTF-8 (.CSV)**



5. Click **Save**
6. Open the csv file with a text editor and be sure that the first line contains the name of the columns *example, intent*.

Your csv file is ready to use.

Test environment

12. Create a Watson Assistant workspace

1. Create a new Workspace in your existing Watson Assistant service.

2. Copy the credentials and workspace ID

13. Create a Watson Studio instance

You can use also an existing instance of Watson Studio in the right region. You should have created a Watson Studio service and *Assistant Evaluation* project during the labs 'Improving conversation Lab instruction' labs. In this case, skip the following steps and go to the next chapter.

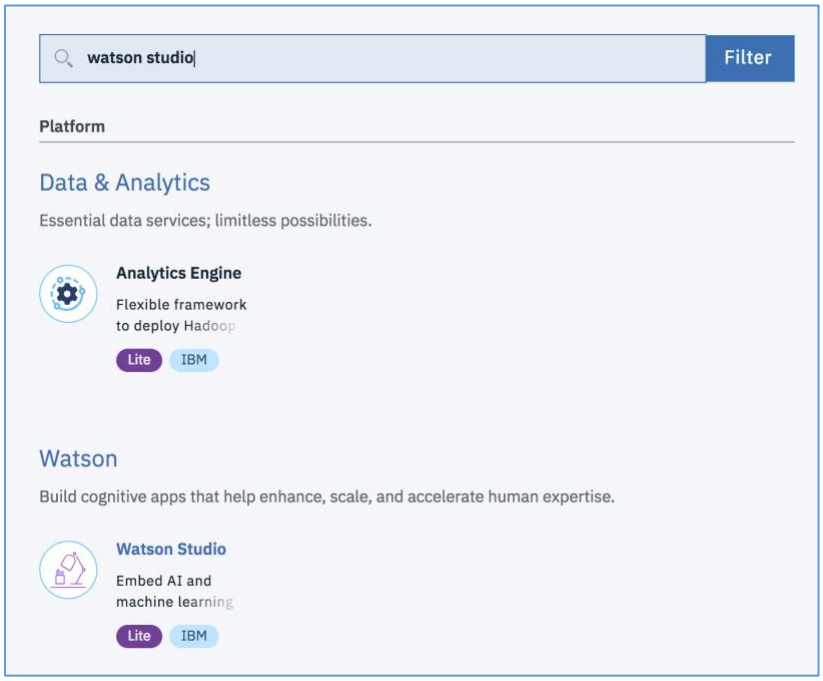
If you didn't it in the "improving a conversational solution Labs"

1. Go back on your IBM Cloud Dashboard.

2. Create a new resource (**create resource** button)

Note: be sure to create the Watson studio instance and the Watson Assistant in the same region.

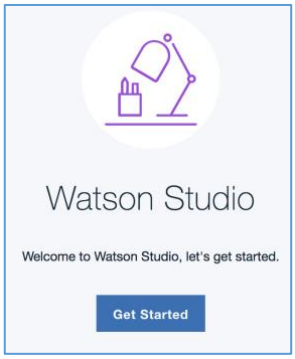
3. Look for Watson studio



4. Then click on **Watson Studio** tile

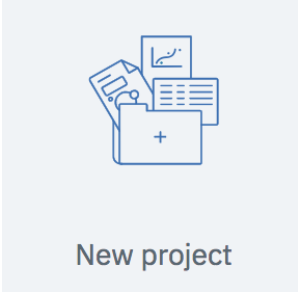
5. Keep the default settings and click **Create**

6. Click Get Started



14. Create a project

1. Click on new project tile, you can use an existing project (with Jupyter Notebooks) and just add a new notebook



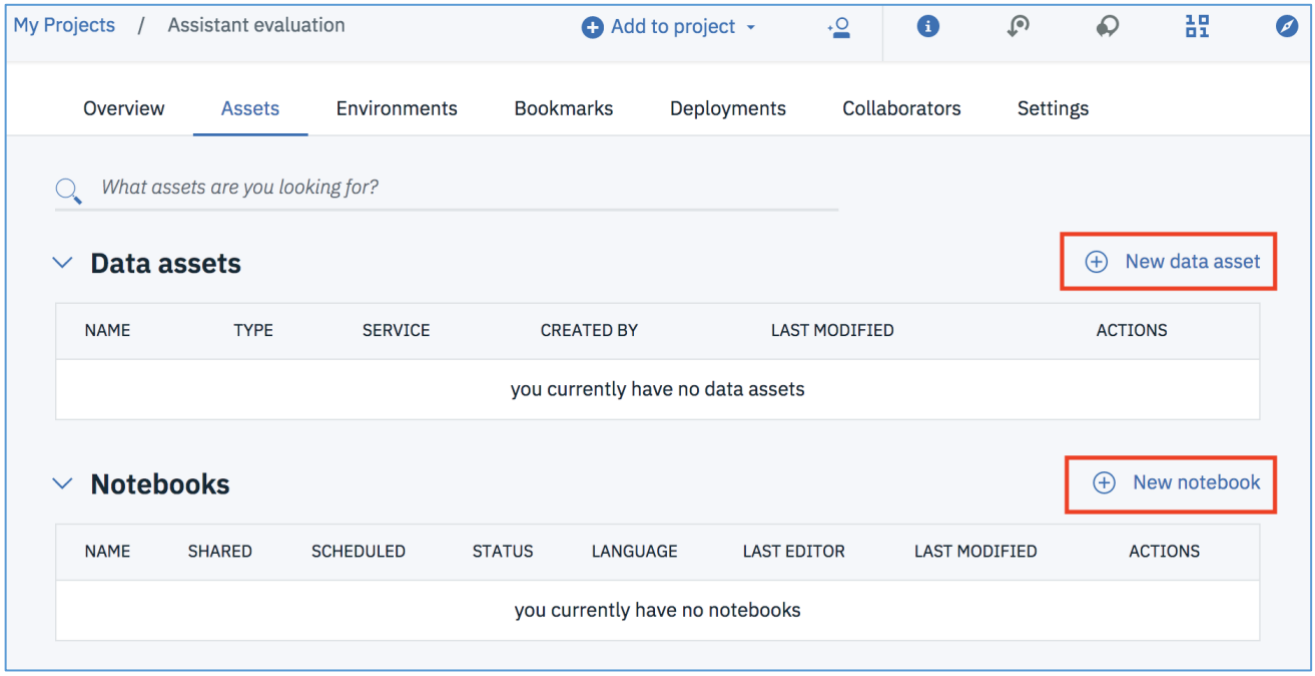
2. Select “standard” tile and click **OK**
3. Name it *Assistant Evaluation*
4. Keep the default storage, click **Create**

Test your Ground Truth with Watson Studio

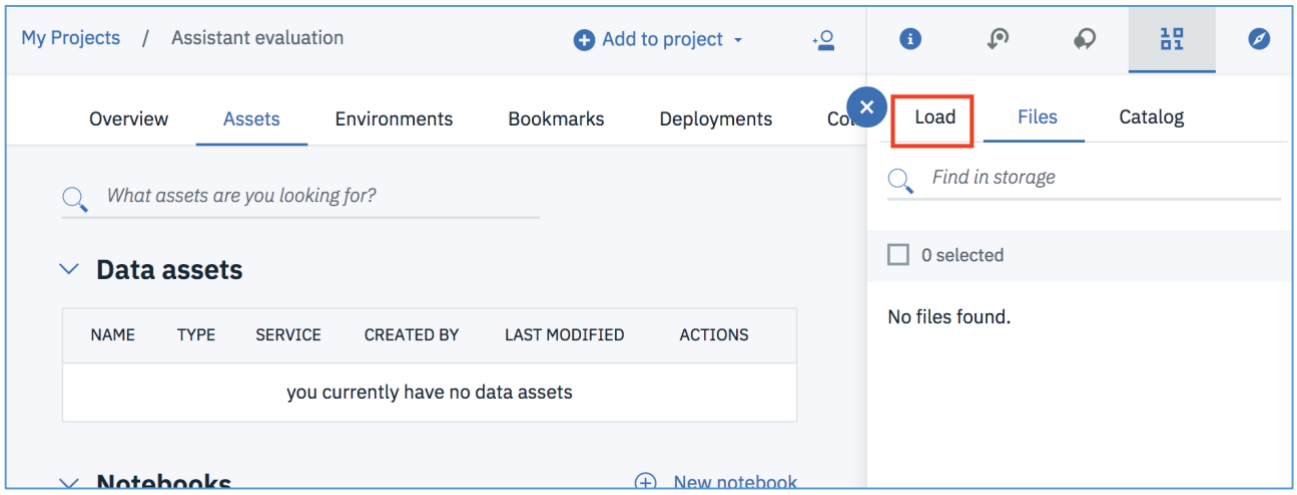
You are going to use Watson Studio to test the efficiency of your Ground Truth.

15. Create Watson Studio resources

1. In the project Assistant Evaluation project, select **Assets** tab
2. Click on **New data set**



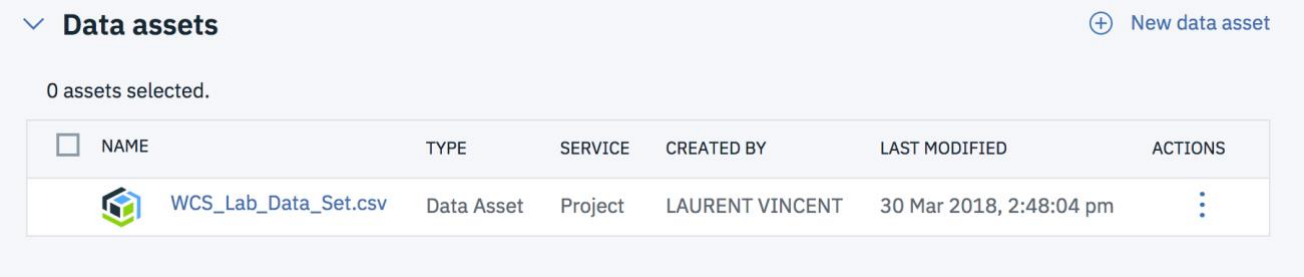
3. Select **Load** tab from the data panel.



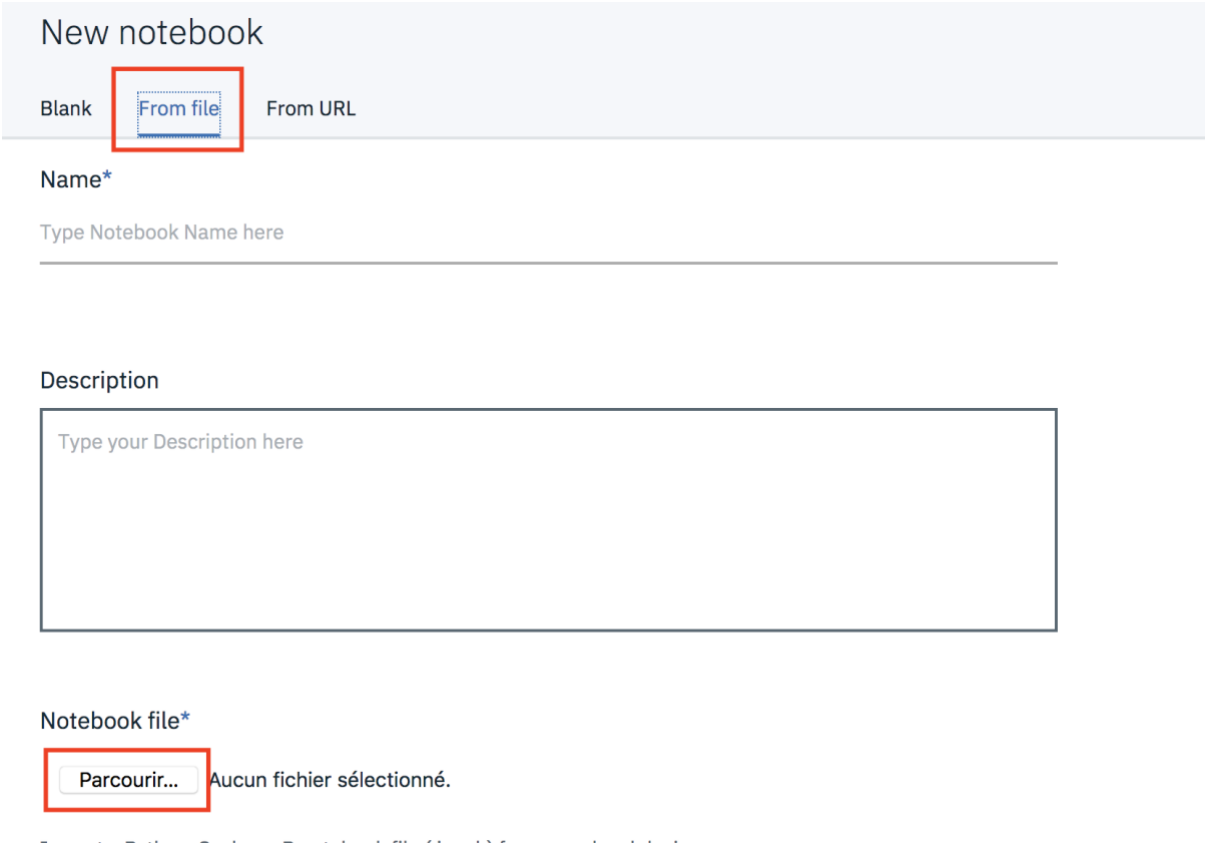
4. Upload the csv file you have created *WCS_Lab_Data_set.csv* or the sample

provided

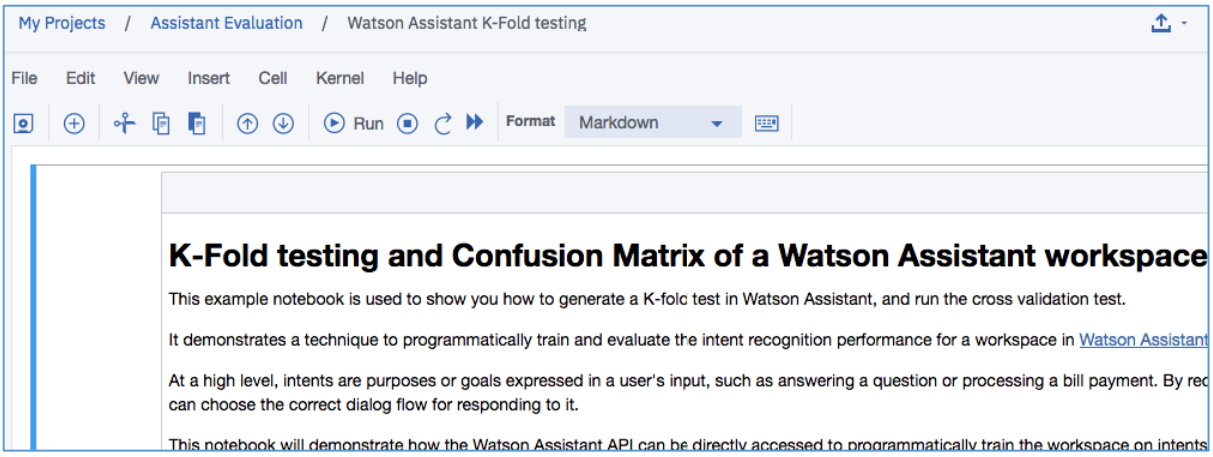
Then your data set is available in your project



5. Click **New Notebook**
6. Select **From File** tab, then **browse**



7. Select the notebook *Watson Assistant K-Fold testing.ipynb* provided in the Box
8. Select runtime *Python 3.5 Free*
9. Click **Create Notebook**



10. Now you can follow the instructions in the notebook

16. Reminder: Accuracy and Precision

Now you are ready to calculate Accuracy and Precision of your conversational solution.

I remind you for 1000 test utterances to WCS

Accuracy

If you get 950 of those are correctly classified

(950/1000=95%)

Accuracy = 95%

precision

If you accept a classified intent only if the confidence score is greater than 50%. 700 of those are confidence > 50

(700/1000=70%)

630 of those are correctly classified

(630/700=90%)

Precision at 70% = 90% or

P@70=90%