

IBM Training

Student Exercises

Lab-3: Create a COVID-19 Chabot Hands-On Lab

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Introduction

This lab will build a chatbot to respond to questions about COVID-19. Watson Assistant and Watson Discovery services from IBM will be used to build the chatbot.

Objectives

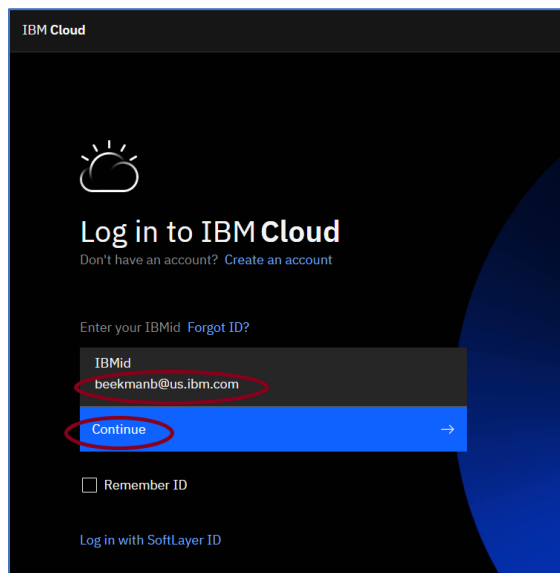
The goal of this lab is to familiarize the user with the Watson Assistant service. Watson Assistant is IBM's AI offering that lets you build, train, and deploy conversational interactions into any application, device, or channel. Watson Assistant can be deployed on any cloud or on-premises environment.

After completing this lab, you will be familiar with these features of Watson Assistant and IBM Cloud.

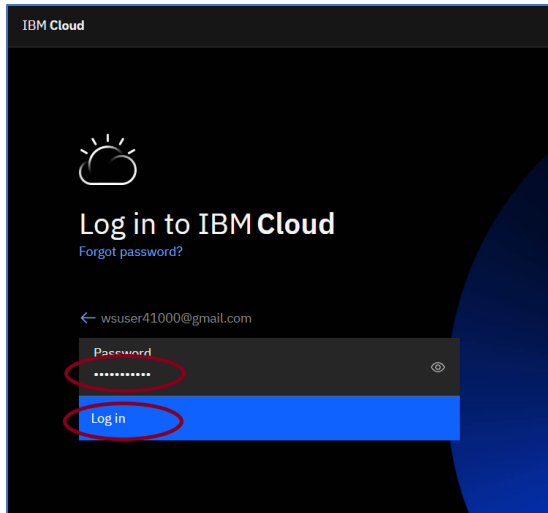
1. Provision an instance of Watson Assistant
2. Add a dialog skill to your Watson Assistant instance
3. Connect your Watson Assistant with Watson Discovery
4. Create Cloud Functions
5. Integrate data sources via a Watson Assistant webhook



Exercise 1: Create a Watson Assistant Instance

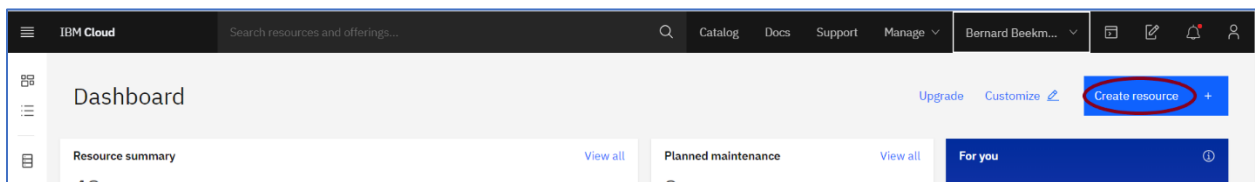
1. Log into your IBM Cloud account by typing in the url **cloud.ibm.com** in your Firefox or Chrome browser. If already logged in, skip to step 5.
2. Enter your **IBMid** and click **Continue**.



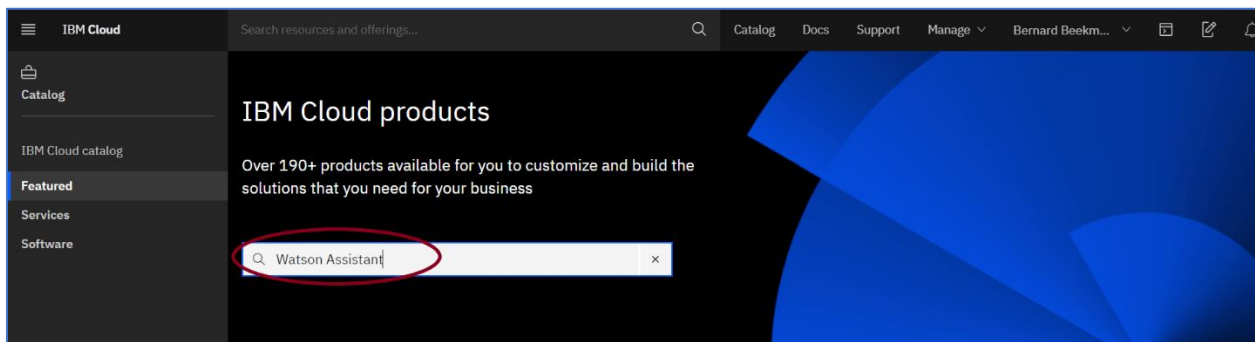
3. Enter your **Password** and click **Log in**.



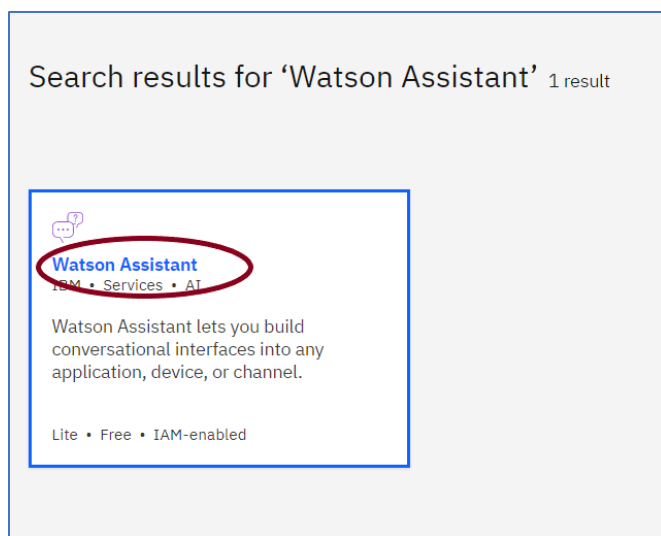
4. Click **Create Resource**. (Note if you were already logged in, and don't see the Create resource button, click on the Hamburger  and then click on  Dashboard.



5. Enter **Watson Assistant** and click the <Enter> key.



6. Click on **Watson Assistant**.



- Click on a location. Make sure it is the same region as the Watson Discovery instance created in Lab-1. If you have not created a Watson Discovery instance, then make sure that you don't choose Dallas as the location. Click on **Plus Trial** (this is needed for adding Search skills) and click **Create**.

Select a location
Washington DC (us-east)

Select a pricing plan
Displayed prices do not include tax. Monthly prices shown are for country or location: [United States](#)

Plan	Features	Pricing
Lite	<p>Everything you need to get started, free for as long as you need it</p> <p>Up to 1,000 unique monthly active users (MAUs) chatting with your assistant</p> <p>Up to 10,000 messages per month</p> <p>--- Features ---</p> <ul style="list-style-type: none"> - World-class conversational AI with Watson - Make your website assistant your own with Webchat - deploy Webchat in minutes, or use our fully extensible architecture - Keep your assistant up-to-date by automatically scanning existing webpages and documents or by using some of our prebuilt dialog content - Connect to any application or database with a prebuilt integration, or build your own custom integration on top of API endpoints - Create engaging user interactions using images, buttons, and more - Analyze and enhance your assistant with our analytics dashboard - Take comfort knowing your assistant is reliably hosted on IBM Public Cloud <p>--- Limits ---</p> <p>Up to 5 Skills (Dialog, Action, Search)</p> <p>7 days of usage analytics</p> <p>Session inactivity timeout 5 minutes</p> <p>Services are deleted after 30 days of inactivity</p>	Free
Trial	<p>30 Day trial period (no credit card required)</p> <p>Up to 5,000 MAUs</p> <p>Up to 50,000 messages per month</p> <p>--- Features ---</p>	Free

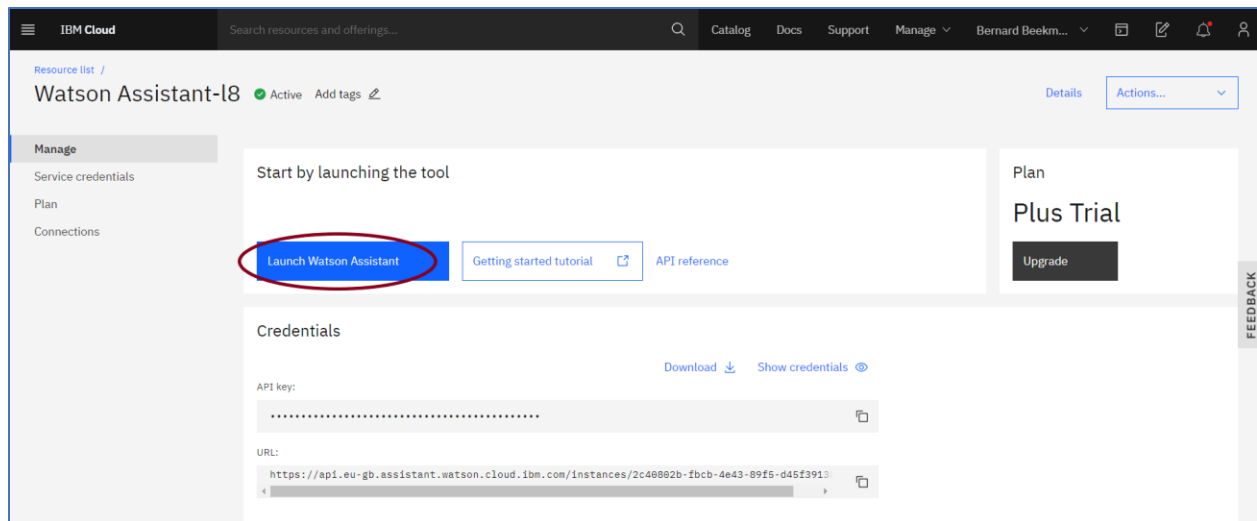
Watson Assistant **Free**


Location: Washington DC
Plan: Trial
Service name: Watson Assistant-1o
Resource group: Default

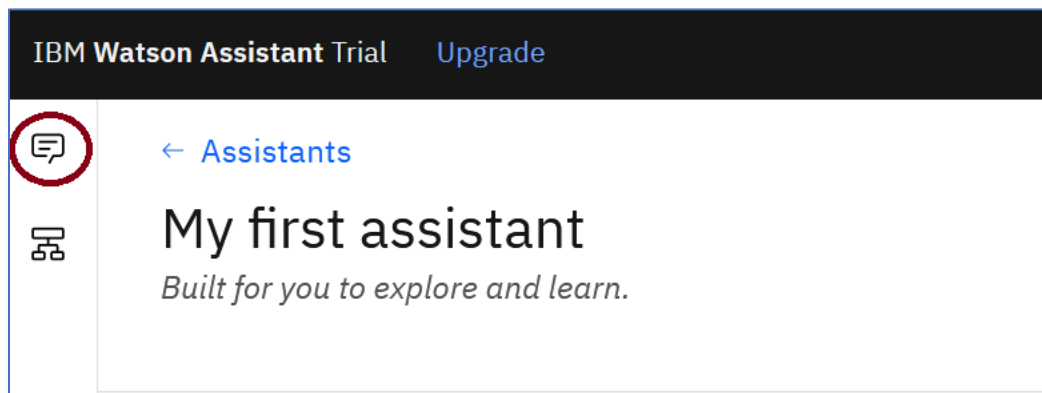
Create

Add to estimate

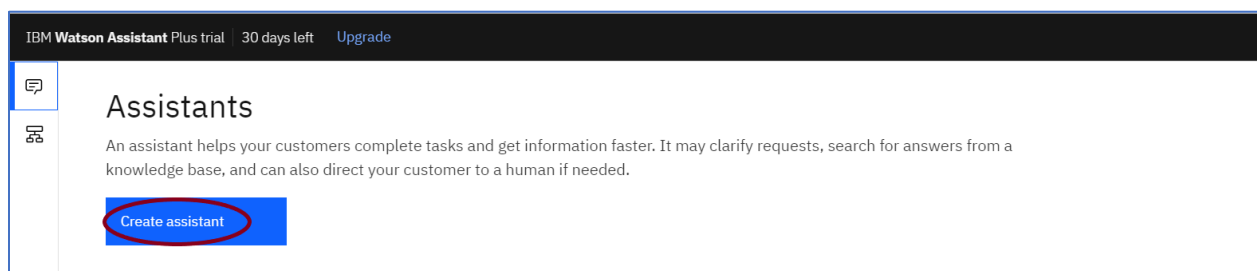
- Click on **Launch Watson Assistant**.



9. Click on the assistant icon  .



10. The My first assistant is created automatically. Click on **Create assistant**.



11. Enter **COVID-19 Crisis Communication** for the Name and click **Create assistant**.

Create assistant

Create an assistant to deploy the skill that addresses your customers' goals.

Name

COVID-19 Crisis Communication

Name your assistant, for example Banking or Customer Care.

Description (optional)

Add a description for this assistant

Web chat ⓘ

☒ Enable web chat

Preview link ⓘ

☒ Enable preview link

Create assistant

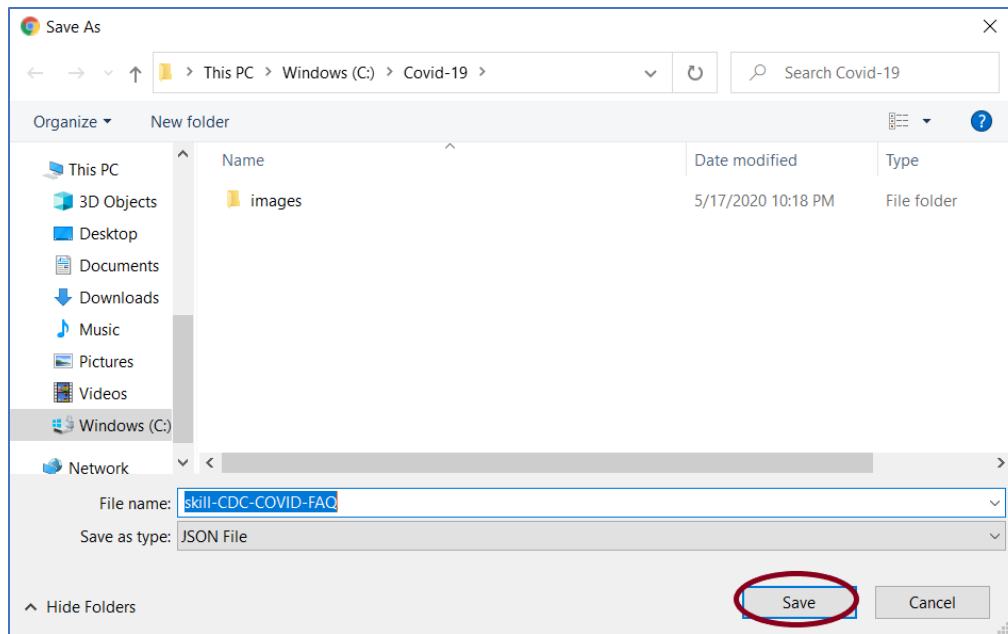
Exercise 2: Download the COVID-19 FAQ file.

In this exercise, you will download a COVID-19 FAQ file. This file will contain the configuration for Watson Assistant to be able to respond to COVID-19 inquiries. The file consists of pre-defined intents, entities, and dialogs.

1. Click [here](#) to download the FAQ file.
2. Right-click on **Raw**, then click on **Save link as ...**



3. Navigate to the location that you want to save the file then click **Save**.



Intents, Entities, and Dialogs are discussed in more detail below to explain the content of the JSON file and how intents, entities, and dialogs are used to by Watson Assistant to implement a chatbot. The lab steps continue with Exercise 3: Create a Watson Assistant Skill.

Intents

Intents are purposes or goals that are expressed in a customer's input, such as having a question answered or processing a bill payment. By recognizing the intent expressed in a customer's input, the Watson Assistant service can choose the correct dialog flow for responding to it.

In planning the intents for your application, consider what your customers might want to do, and what you want your application to be able to handle on their behalf. For example, you might want your application to help your customers make a purchase. If so, you can add a `#buy_something` intent. (The `#` that is added as a prefix to the intent name helps to clearly identify it as an intent.)

After you decide which business requests that you want your application to handle for your customers, you must teach Watson about them. For each business goal (such as `#buy_something`), you must provide at least 5 examples of utterances that your customers typically use to indicate their goal. For example, `I want to make a purchase.`

Ideally, find real-world user utterance examples that you can extract from existing business processes. The user examples should be tailored to your specific business. For example, if you are an insurance company, a user example might look more like this, `I want to buy a new XYZ insurance plan.`

The examples that you provide are used by your assistant to build a machine learning model that can recognize the same and similar types of utterances and map them to the appropriate intent.

Entities

Entities represent information in the user input that is relevant to the user's purpose.

If intents represent verbs (the action a user wants to do), entities represent nouns (the object of, or the context for, that action). For example, when the *intent* is to get a weather forecast, the relevant location and date *entities* are required before the application can return an accurate forecast.

Recognizing entities in the user's input helps you to craft more useful, targeted responses. For example, you might have a `#buy_something` intent. When a user makes a request that triggers the `#buy_something` intent, the assistant's response should reflect an understanding of what the *something* is that the customer wants to buy. You can add a `@product` entity, and then use it to extract information from the user input about the product that the customer is interested in. (The `@` prepended to the entity name helps to clearly identify it as an entity.)

Your assistant detects entities in the user input by using one of the following evaluation methods:

Dictionary-based method

Your assistant looks for terms in the user input that match the values, synonyms, or patterns you define for the entity.

- **Synonym entity:** You define a category of terms as an entity (`color`), and then one or more values in that category (`blue`). For each value you specify a bunch of synonyms (`aqua`, `navy`). You can also pick synonyms to add from recommendations made to you by Watson.

At run time, your assistant recognizes terms in the user input that exactly match the values or synonyms that you defined for the entity as mentions of that entity.

- **Pattern entity:** You define a category of terms as an entity (`contact_info`), and then one or more values in that category (`email`). For each value, you specify a regular expression that defines the textual pattern of mentions of that value type. For an `email` entity value, you might want to specify a regular expression that defines a `text@text.com` pattern.

At run time, your assistant looks for patterns matching your regular expression in the user input, and identifies any matches as mentions of that entity.

- **System entity:** Synonym entities that are prebuilt for you by IBM. They cover commonly used categories, such as numbers, dates, and times. You simply enable a system entity to start using it.

Annotation-based method

When you define an annotation-based entity, which is also referred to as a contextual entity, a model is trained on both the *annotated term* and the *context* in which the term is used in the sentence you annotate. This new contextual entity model enables your assistant to calculate a confidence score that identifies how likely a word or phrase is to be an instance of an entity, based on how it is used in the user input.

- **Contextual entity:** First, you define a category of terms as an entity (`product`). Next, you go to the *Intents* page and mine your existing intent user examples to find any mentions of the entity, and label them as such. For example, you might go to the `#buy_something` intent, and find a user example that says, I want to buy a Coach bag. You can label `Coach bag` as a mention of the `@product` entity.

For training purposes, the term you annotated, `Coach bag`, is added as a value of the `@product` entity.

At run time, your assistant evaluates terms based on the context in which they are used in the sentence only. If the structure of a user request that mentions the term matches the structure of an intent user example in which a mention is labeled, then your assistant interprets the term to be a mention of that entity type. For example, the user input might include the utterance, I want to buy a Gucci bag. Due to the similarity of the structure of this sentence to the user example that you annotated (I want to buy a Coach bag), your assistant recognizes `Gucci bag` as a `@product` entity mention.

When a contextual entity model is used for an entity, your assistant does *not* look for exact text or pattern matches for the entity in the user input but focuses instead on the context of the sentence in which the entity is mentioned.

If you choose to define entity values by using annotations, add at least 10 annotations per entity to give the contextual entity model enough data to be reliable.

Dialogs

The **dialog** uses the intents that are identified in the user's input, plus context from the application, to interact with the user and ultimately provide a useful response. It defines the flow of your conversation in the form of a logic tree. It matches intents (what users say) to responses (what your virtual assistant says back). Each node of the tree has a condition that triggers it, based on user input.

The response might be the answer to a question such as `Where can I get some gas?` or the execution of a command, such as turning on the radio. The intent and entity might be enough information to identify the correct response, or the dialog might ask the user for more input that is needed to respond correctly. For example, if a user asks, `Where can I get some food?` you might want to clarify whether they want a restaurant or a grocery store, to dine in or take out, and so on. You can ask for more details in a text response and create one or more child nodes to process the new input.

Exercise 3: Create a Watson Assistant Skill

Watson assistant receives user input and routes it to the appropriate skill. You customize your assistant by adding to it the skills it needs to satisfy your customers' goals. There are two broad categories of skills. Conversational skills return responses that are authored by you to answer common questions, while a search skill searches for and returns passages from existing self-service content.

Conversational Skills

Conversational Skills understand and address questions or requests that your customers typically ask about. You provide information about the subjects or tasks that your users need help with, and how they ask about them, and the product dynamically builds a machine learning model that is tailored to understand the same and similar user requests.

When you build the flow of conversation between your assistant and your customers, there are two skill types to choose from:

- Action skill – this is a relatively newer skill. Offers a simple interface where anyone can build a conversational flow for your assistant to follow. The complex process of training data creation occurs behind the scenes automatically.
- Dialog skill - Offers a set of editors that you use to define both your training data and the conversation. The conversation is represented as a dialog tree. You use the graphical dialog editor to create a script of sorts for your assistant to read from when it interacts with your customers. The dialog keys off the common customer goals that you teach it to recognize and provides useful responses.

Search Skill

Leverages information from existing corporate knowledge bases or other collections of content authored by subject matter experts to address unanticipated or more nuanced customer inquiries. The search skill routes complex customer queries to Watson Discovery that are not handled by the conversational skills. For a given user query, uses the IBM Watson™ Discovery service to find information relevant to the query from the configured data sources, extracts the passage, and returns it so the assistant can share the information with the user as its response.

In this Exercise we will create a dialog skill. A search skill will be created in a later exercise.

1. Click **Add dialog skill**

Actions or Dialog

Build conversations

Understand and address questions or requests that your customers typically ask.

- **Actions** lets you have an assistant ready to chat in less time, with less effort. Compose step-by-step flows for any range of simple or complex conversations.
- **Dialog** offers a set of full-feature editors that you use to define both your training data and the conversation, with greater control over the logic flow.

[Learn more](#)

Add an actions or dialog skill

2. Click **Upload skill**.

Add Actions or Dialog skill

Add an existing skill or use the sample skill.

Add existing skill Create skill Use sample skill **Upload skill**

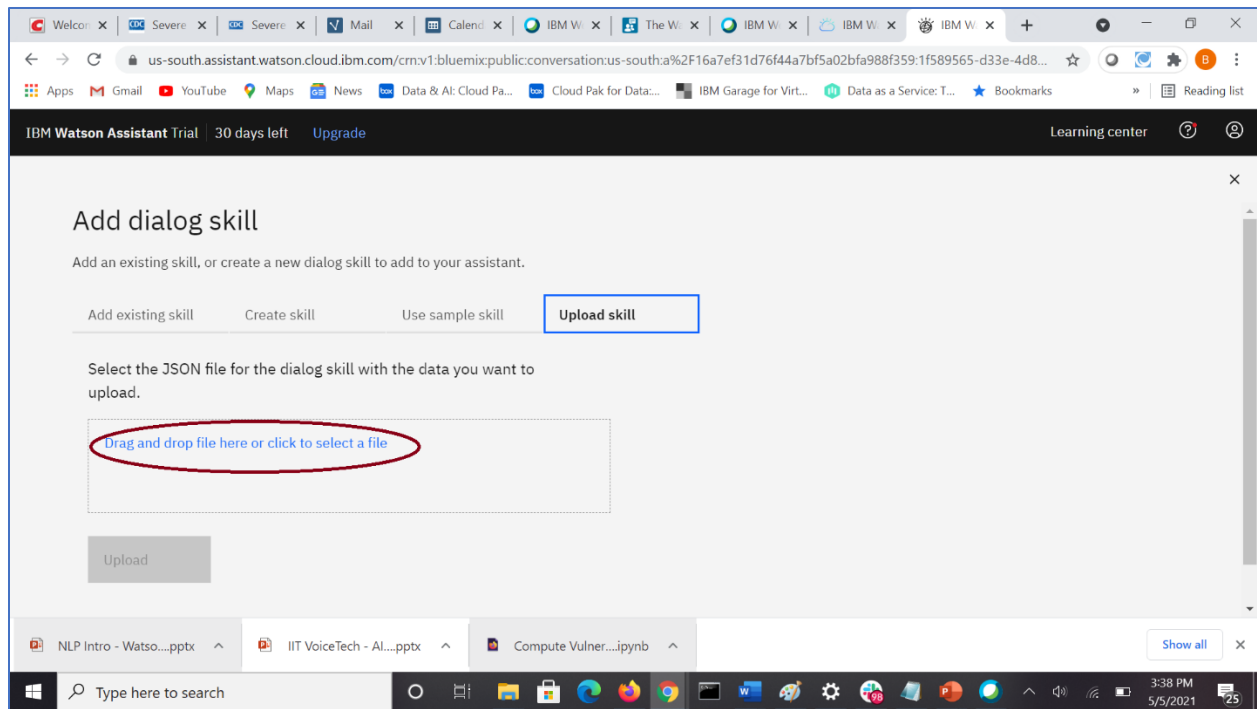
My first skill

TYPE: Dialog — English (US)

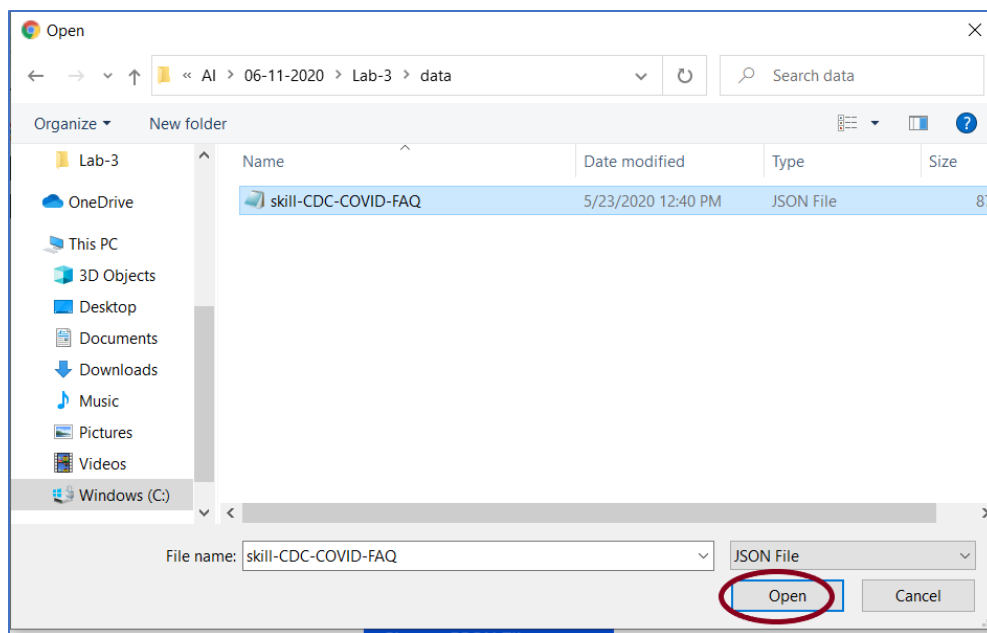
CREATED: Jul 25, 2021 12:28 PM EDT UPDATED: Jul 25, 2021 12:28 PM EDT

LINKED ASSISTANTS (1): [My first assistant](#)

3. Click on **Drag and drop file here or click to select file**



4. Navigate to the directory where you stored the JSON file, click on the file, and click **Open**.



5. Click **Upload**.

Add Actions or Dialog skill

Add an existing skill or use the sample skill.

Add existing skill

Create skill

Use sample skill

Upload skill

Select the JSON file for the actions or dialog skill with the data you want to upload.

Drag and drop file here or click to select a file

skill-CDC-COVID-FAQ.json

×

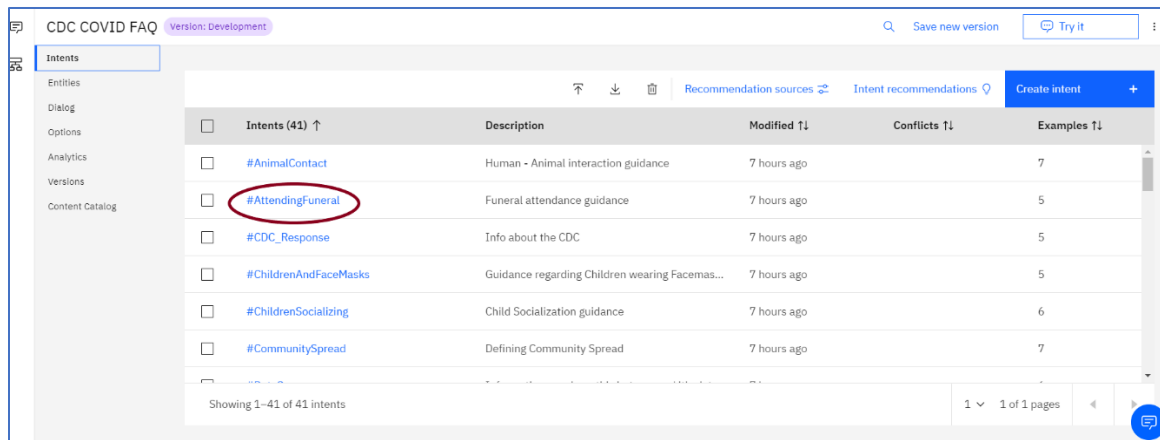
Upload

- The file was successfully imported, and the CDC COVID FAQ skill was added. You can see there are **52 Intents**, **7 Entities**, and **73 Dialog nodes**. Click on the **CDC COVID FAQ Skill**.

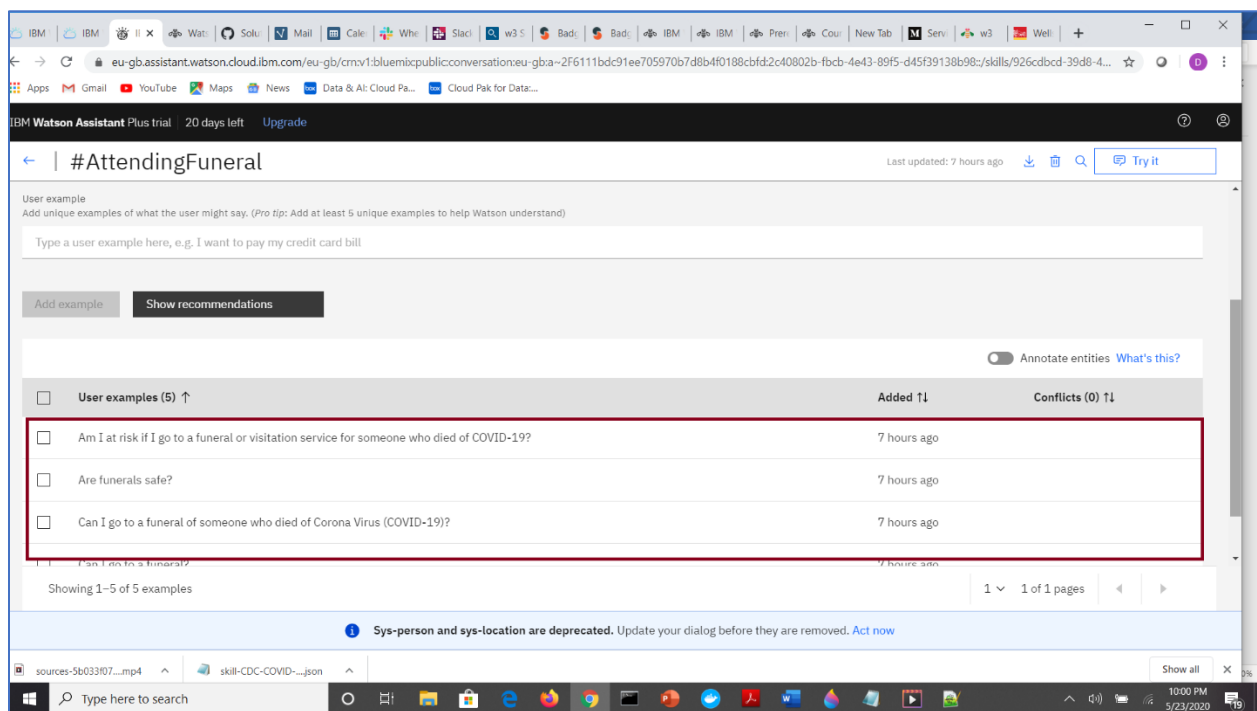
Dialog

CDC COVID FAQ					:
LANGUAGE: English (US)	TRAINED DATA: 52 Intents 7 Entities 73 Dialog nodes	VERSION: draft	DESCRIPTION: ---	VERSION CREATED: Nov 8, 2020 12:43 PM EST	
LINKED ASSISTANTS (1): COVID-19 Crisis Communication					

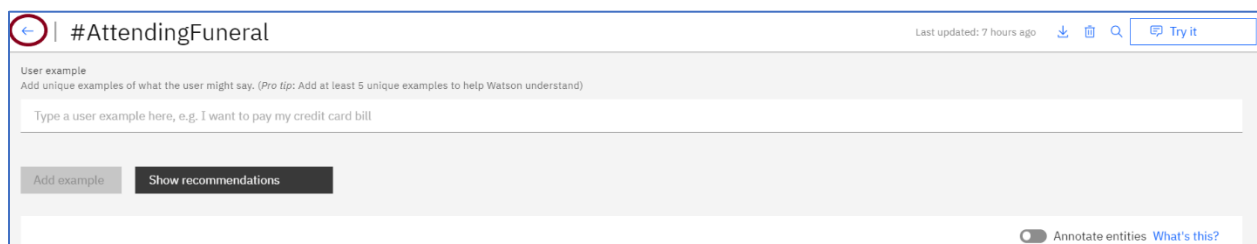
- You can browse through the Intents. Click on one of them and view the examples provided to train the intent. #AttendingFuneral was selected in the figure below.



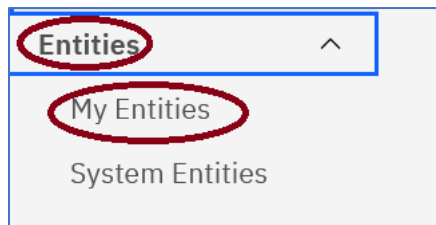
8. Scroll down to view the examples.



9. Click on the back arrow icon  to return to the **Intents** page.



10. Click on **Entities**, then **My Entities**



11. Six (6) entities are shown. Note, there is also 1 system entity enabled in the **System entities** tab. That adds up to the 7 total entities documented above. The entities all use the Dictionary-based evaluation method. Four entities (shown in Maroon) use dictionaries, 1 entity (shown in Blue) uses a regular expression, and 1 entity (shown in Green) uses a system entity and regular expression.

A screenshot of the 'My entities' tab in a web application. The left sidebar shows a navigation menu with 'Entities' and 'My entities' selected. The main area displays a table of 6 entities. Each entity has a checkbox, a name, a value, and a 'Modified' timestamp. The entities are: @coronavirus (maroon), @landmark (maroon), @phone (blue), @reply (maroon), @school_type (maroon), and @zip_code (green). A 'Create entity' button is in the top right. The table has columns for checkboxes, entity names, values, and modified times.

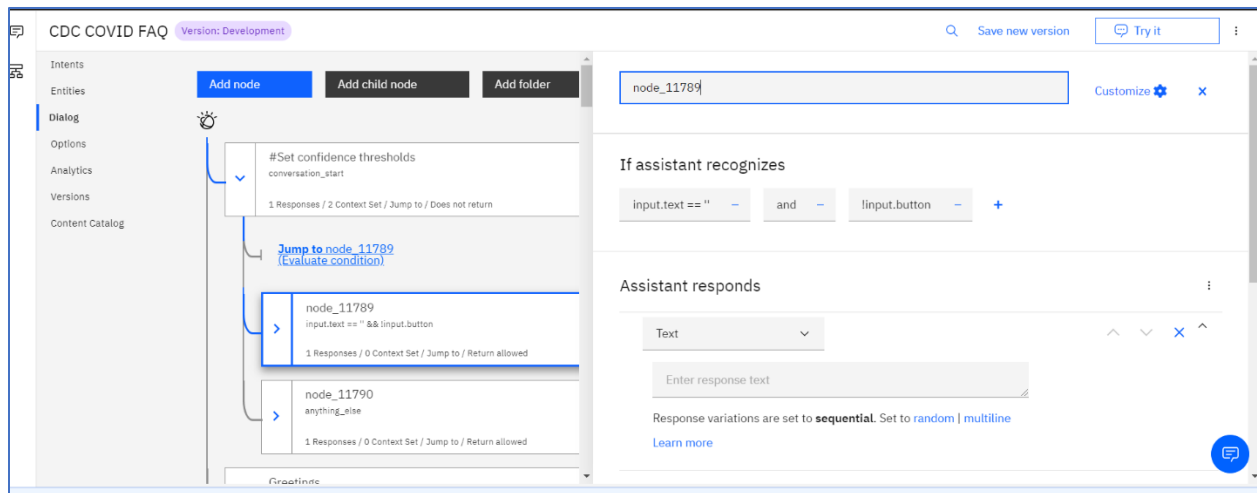
<input type="checkbox"/>	Entity (6) ↑	Values	Modified ↑↓
<input type="checkbox"/>	@coronavirus	coronavirus	7 hours ago
<input type="checkbox"/>	@landmark	empire state building, times square, grand central	7 hours ago
<input type="checkbox"/>	@phone	US Phone pattern	7 hours ago
<input type="checkbox"/>	@reply	no, yes	7 hours ago
<input type="checkbox"/>	@school_type	high school, grade school, middle school, college, preschool	7 hours ago
<input type="checkbox"/>	@zip_code	@sys-number	7 hours ago

12. Click on the Dialog option.

A screenshot of the 'Dialog' tab in a web application. The left sidebar shows a navigation menu with 'Intents' and 'Dialog' selected. The main area displays a table of intents. Each intent has a checkbox, a name, a description, and a 'Modified' timestamp. The intent shown is #AdditionalWorkplaceHygiene. A 'Recommendation sources' link is in the top right. The table has columns for checkboxes, intent names, descriptions, and modified times.

<input type="checkbox"/>	Intents (52) ↑	Description	Modified ↑↓	Confli
<input type="checkbox"/>	#AdditionalWorkplaceHygiene	Answer what to do and provide to decrea...	an hour ago	

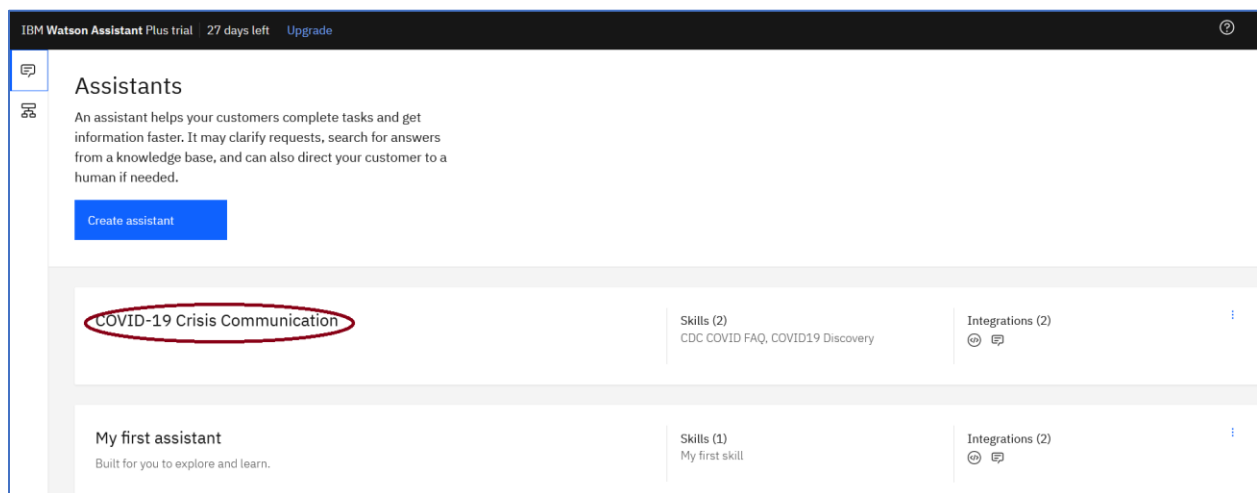
13. Browse through the dialog nodes to get a feel for the navigation logic.



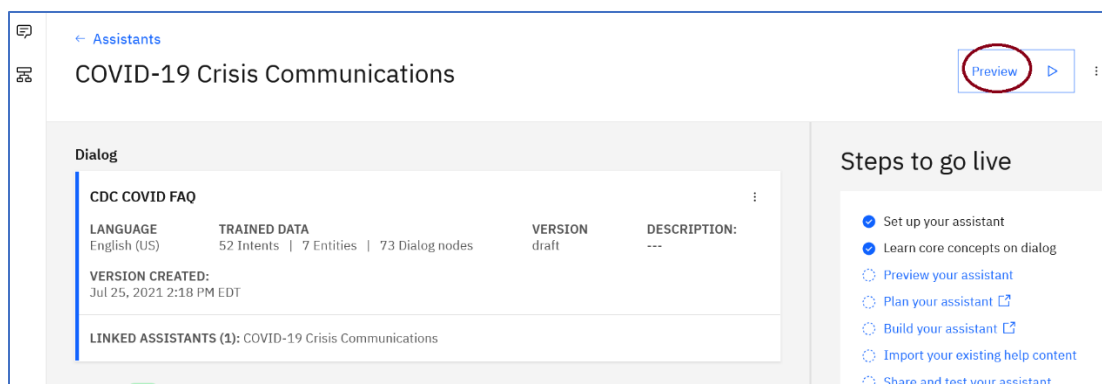
14. Click on the Assistant icon  to return to the All Assistants page.



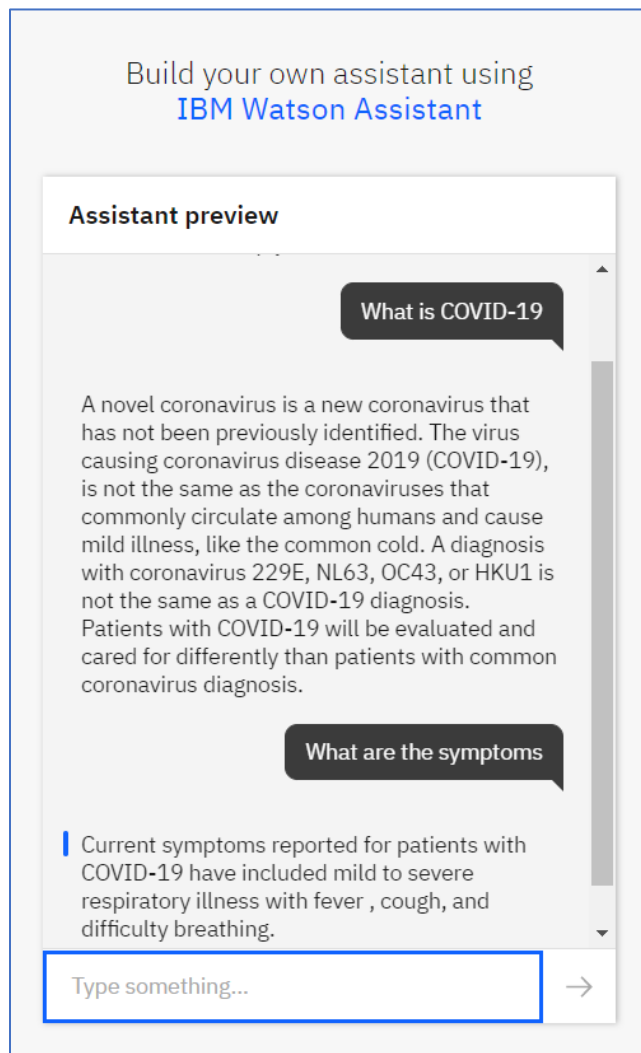
15. Click on COVID-19 Crisis Communication



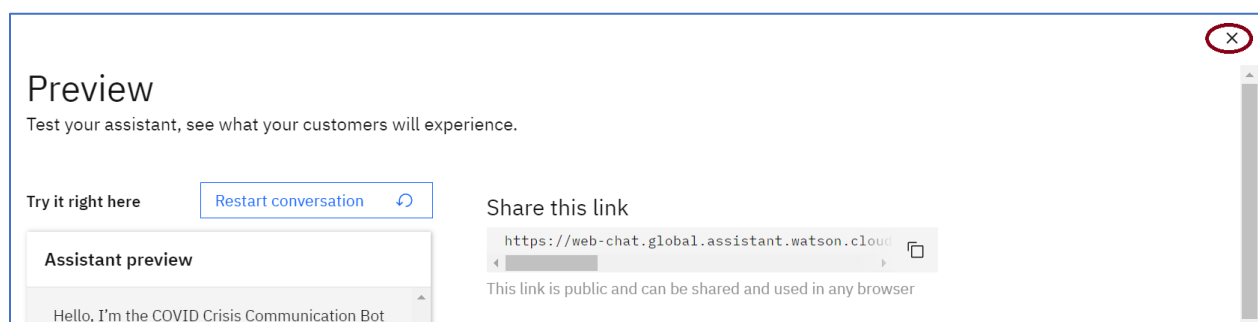
16. Click on **Preview** link.



17. Type in “What is COVID-19” and then click on the right arrow icon. Type in “What are the symptoms” and then click on the right arrow icon. You should see the responses shown in the figure below.



18. Click on the close icon (x) to close the **Preview** page.



Exercise 4: Add a Search Skill

The data that is currently driving the chatbot is static data. You can connect your Watson Assistant chatbot to data sources to query dynamic data. Our crisis communication chatbot uses two different data sources.

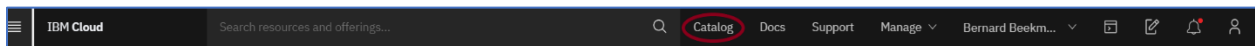
- [Watson Discovery](#)
- [COVID-19 API](#)

This section will connect the Watson Assistant to a Watson Discovery collection by creating a **search skill**.

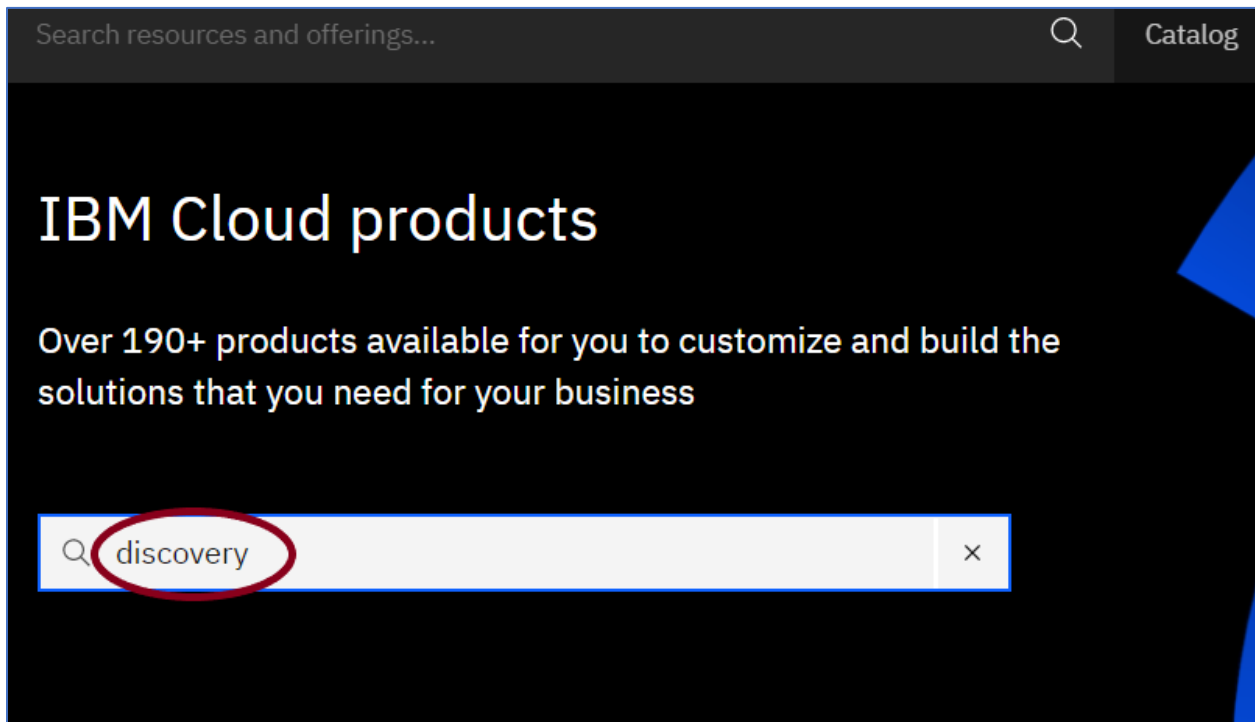
1. This lab is designed to be able to standalone. So, the assumption here is that a Discovery service needs to be created. If one already exists, please skip to step 7. Otherwise, click on the Watson Service browser tab.



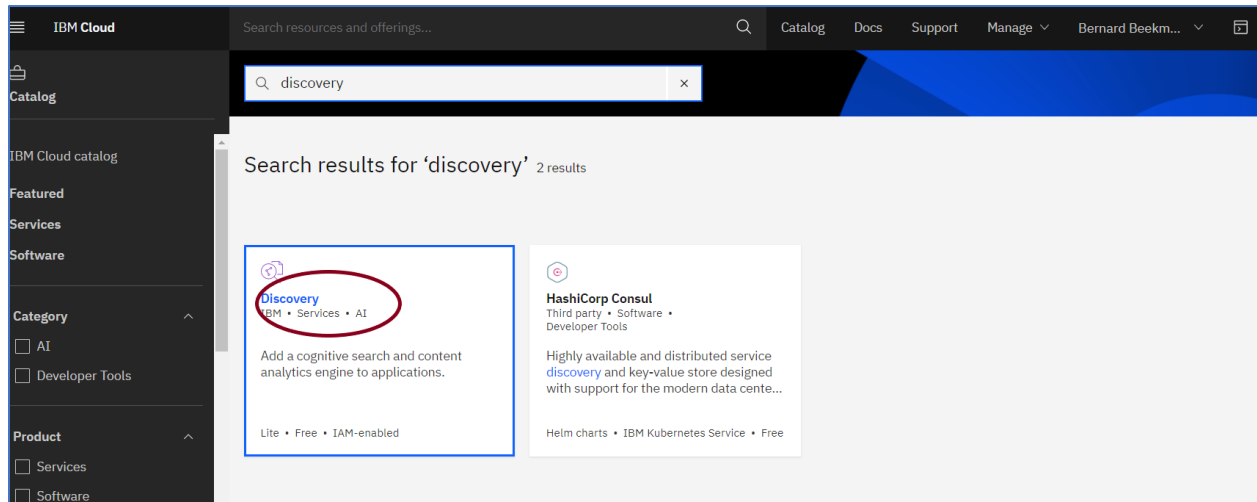
2. Click on **Catalog**.



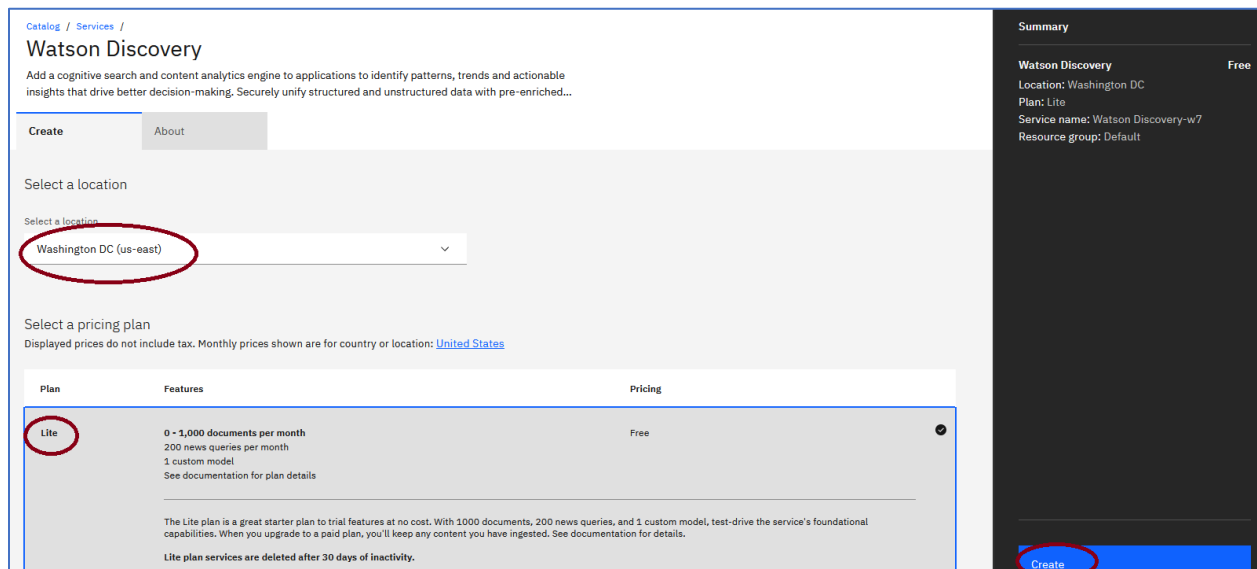
3. Enter discovery in the search box and click the <Enter> key.



4. Click **Discovery**.



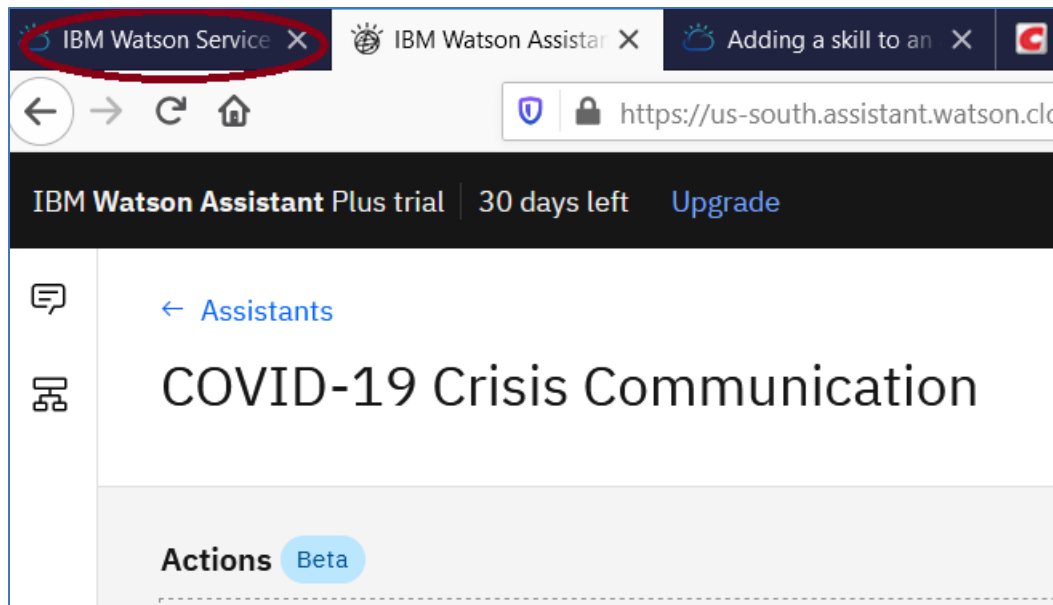
5. Click **Create** to create the Discovery instance. **MAKE SURE TO CHANGE THE DISCOVERY INSTANCE TO BE THE SAME REGION AS THE WATSON ASSISTANT INSTANCE.**



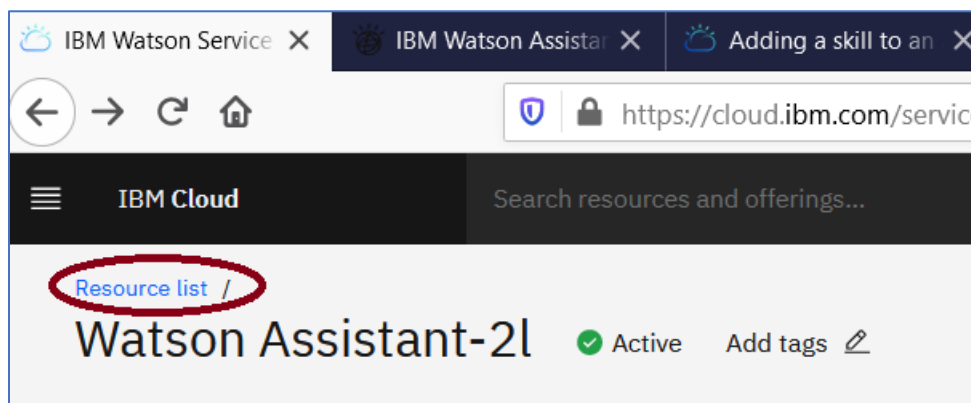
6. The service may take some time to create. The **Resource** list page is displayed with the Discovery service showing a status of Provision in progress. Wait until the status is **Active**, and then skip to step 9.













7. If you already have an existing Watson Discovery service, click on the **IBM Watson Services** browser tab.



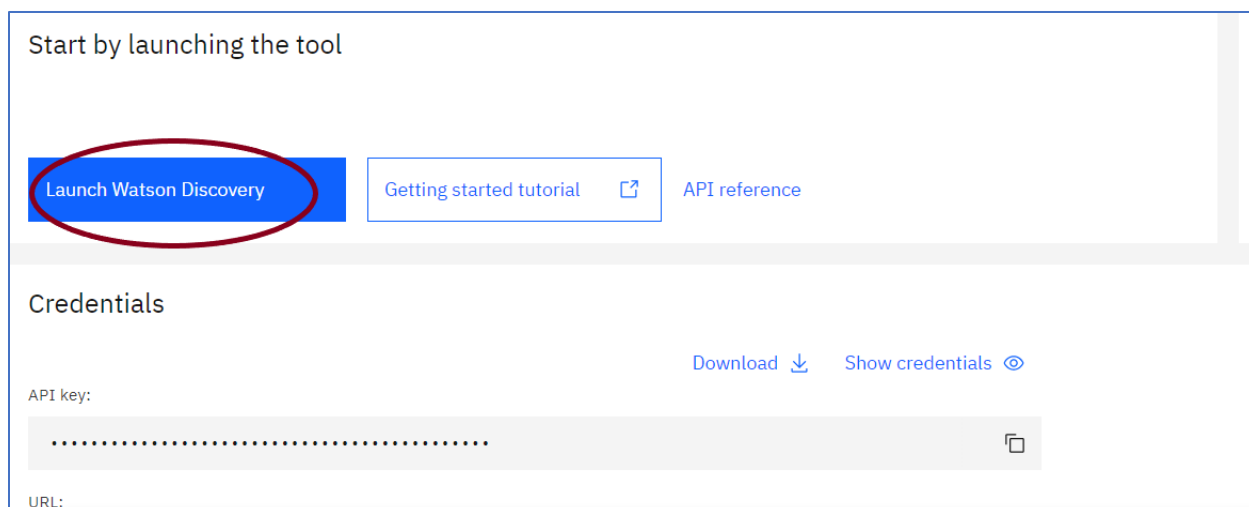
8. Click on **Resources list**.



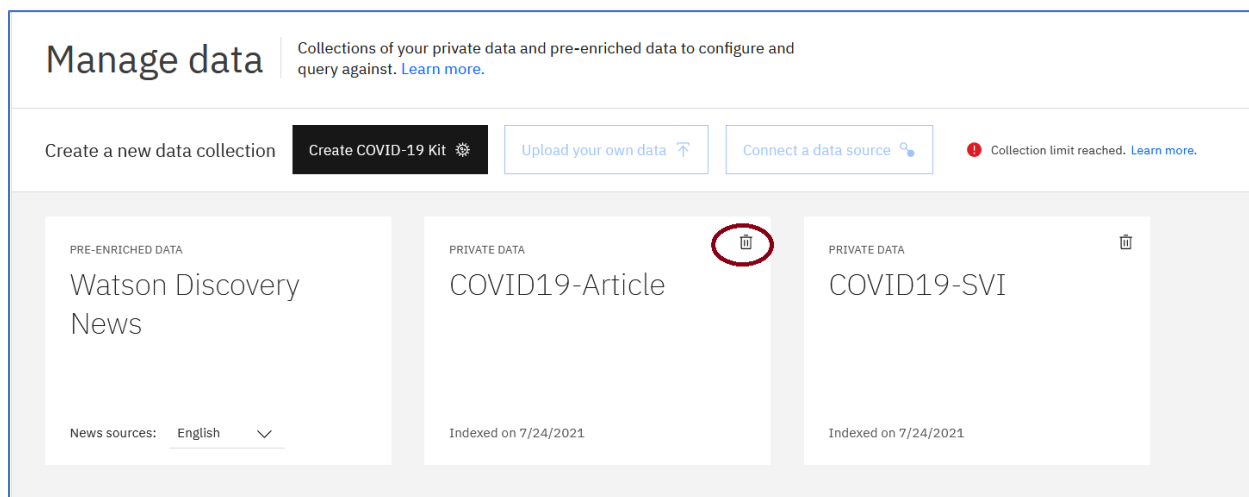
9. Click on the Discovery service.

Services (5)						
 Discovery-33	Default	Dallas	Discovery	 Active	—	
 KnowledgeCatalog	Default	Dallas	Knowledge Catalog	 Active	—	
 Watson Assistant-qib	Default	Dallas	Watson Assistant	 Active	—	
 WatsonMachineLearning	Default	Dallas	Machine Learning	 Active	—	
 WatsonStudio	Default	Dallas	Watson Studio	 Active	—	

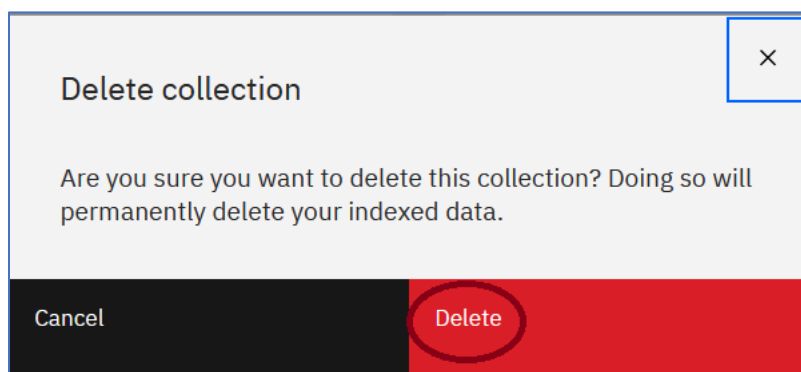
10. Click **Launch Watson Discovery**.



11. Click on the trash icon in the COVID19-Article tile. Only a maximum of two collections are allowed in the Watson Discovery Lite plan.

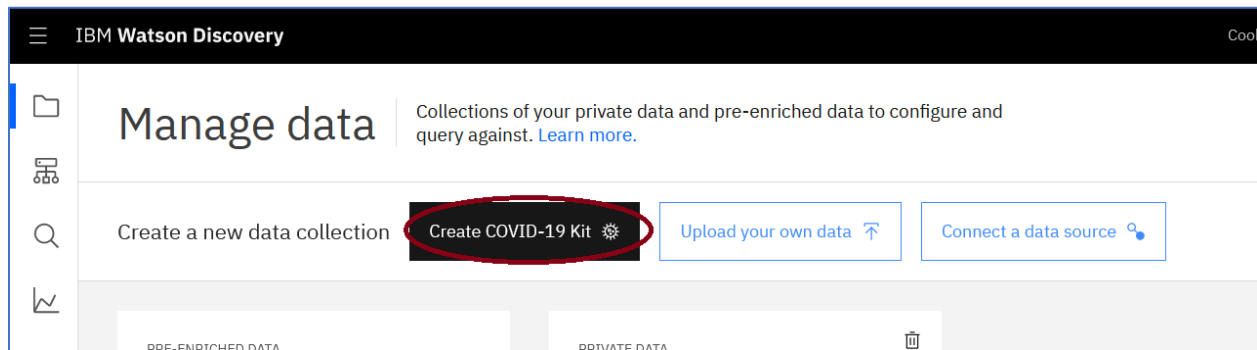


12. Click **Delete**.



13. Click **Create COVID-19 Kit**. This pre-built collection will jump-start your ability to answer people's COVID-19 questions. This collection uses trusted sources to automatically extract

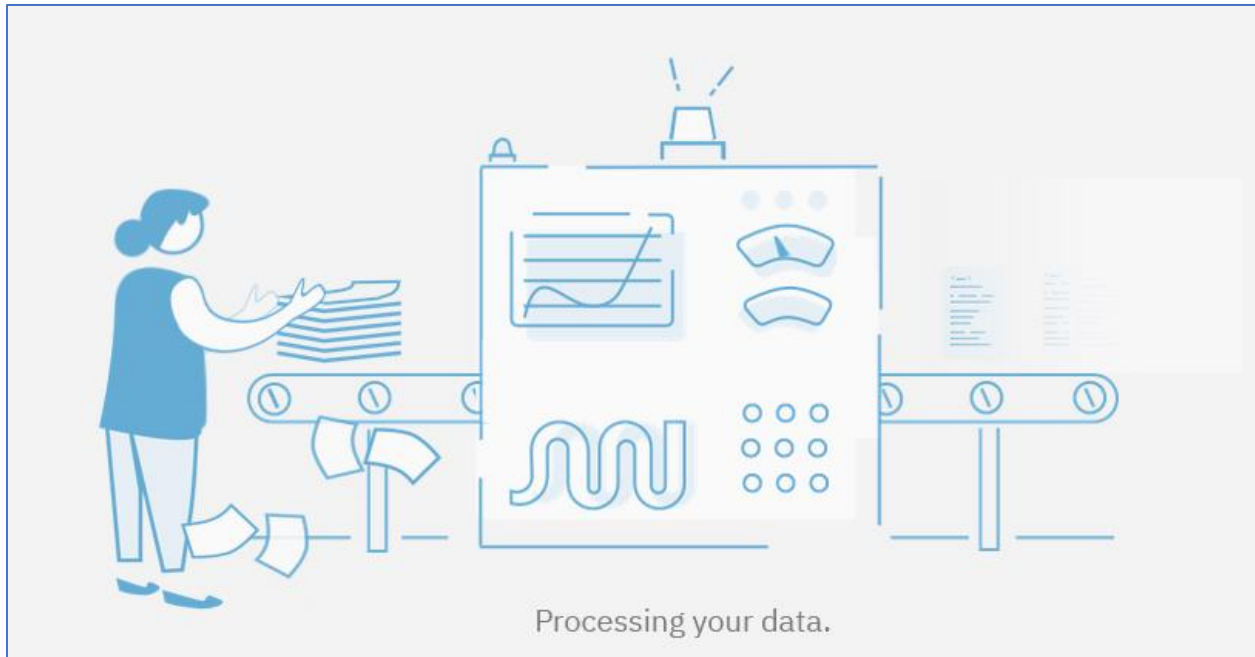
timely information related to COVID-19. You can customize for your users by adding your own URLs to pull answers.



14. Click **Create**.

The screenshot shows a dialog box titled 'Name your new collection' with a close button (X) in the top right corner. The dialog has a light gray background. It contains a 'Collection name' field with the text 'COVID-19 English (Global) 11-08-2020 9:25:48 PM'. Below this is a section titled 'Select the language and region of your collection' with a dropdown menu showing 'English (Global)'. There is a paragraph of text: 'Jump-start your ability to answer people's COVID-19 questions. This collection uses trusted sources to automatically extract timely information related to COVID-19.' followed by another paragraph: 'Customize for your users. Add your own URLs to pull answers from. Integrate on your website in minutes using [Watson Assistant's Search Skill](#) and web chat widget. [Learn more about how it works.](#)'. At the bottom, there are two buttons: 'Cancel' and 'Create' (which is circled in red).

15. Wait until the collection processing is completed.



16. Click on **Sync Settings**.

COVID-19 English (Global) 07-25-2021 4:30:52 PM [🔗](#)

[Overview](#) [Errors and warnings \(0\)](#) [Sync settings](#) [Search settings](#)

100 documents	0 documents failed View details	Sync complete	Next sync scheduled for 7/26/2021 4:30:00 am EDT View sync settings
------------------	--	---------------	---

17. The sites indexed for this collection are listed. Several Harvard health sites are listed.
Sites can be added (such as from the CDC)













COVID-19 English (Global) 11-09-2020 8:46:15 AM [🔗](#)

Overview **Errors and warnings (0)** **Sync settings** **Search settings**

Enter the URLs that you would like to sync

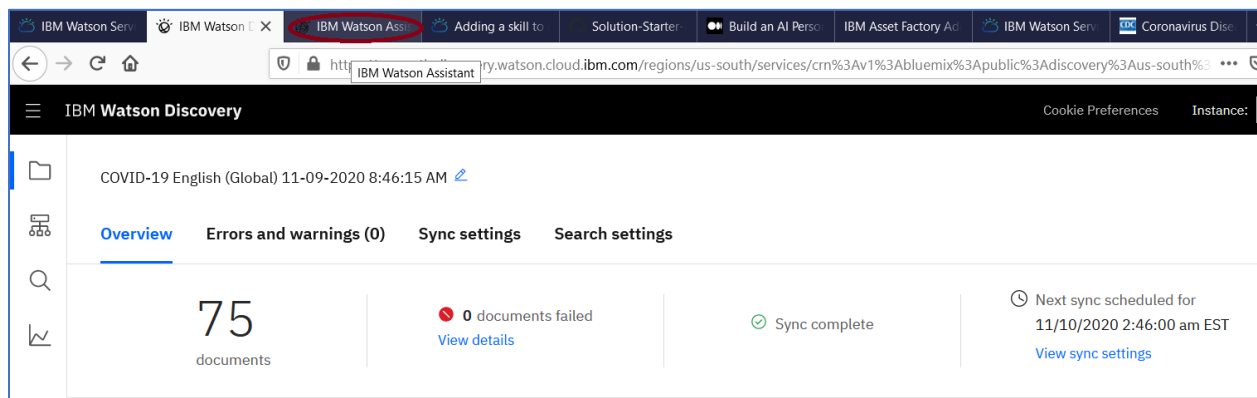
URL to start at (e.g. <http://domain.com> or <http://domain.com/path/sub-path>)

Enter URL Add

https://www.who.int/news-room/q-a-detail/q-a-coronaviruses	 
https://www.health.harvard.edu/diseases-and-conditions/treatments-for-covid-19	 
https://www.health.harvard.edu/diseases-and-conditions/if-you-are-at-higher-risk	 
https://www.health.harvard.edu/diseases-and-conditions/if-youve-been-exposed-to-the-coronavirus	 
https://www.health.harvard.edu/diseases-and-conditions/coronavirus-outbreak-and-kids	 
https://www.health.harvard.edu/diseases-and-conditions/coronavirus-resource-center	 

18. The different sites that were indexed for this collection are listed in the Sync settings. We can see that a few different Harvard health sites are here, but let's say we want our Discovery instance to also pull information from other sources. We just need to copy the URL to the web page from which we want to pull information and add it to this list.

19. Click on the Watson Assistant browser tab.



IBM Watson Assistant

Adding a skill to

Solution-Starte

Build an AI Perso

IBM Asset Factory Ad

IBM Watson Ser

Coronavirus Disc

IBM Watson Assistant

ry.watson.cloud.ibm.com/regions/us-south/services/crn%3Av1%3Abluemix%3Apublic%3Adiscovery%3Aus-south%3

IBM Watson Discovery

Cookie Preferences

Instance:

COVID-19 English (Global) 11-09-2020 8:46:15 AM [🔗](#)

Overview **Errors and warnings (0)** **Sync settings** **Search settings**

75 documents

0 documents failed [View details](#)

Sync complete

Next sync scheduled for 11/10/2020 2:46:00 am EST [View sync settings](#)

20. Click on **Add Search Skill**.

COVID-19 Crisis Communications

Dialog

CDC COVID FAQ

LANGUAGE
English (US)

TRAINED DATA
52 Intents | 7 Entities | 73 Dialog nodes

VERSION
draft

DESCRIPTION:

VERSION CREATED:
Jul 25, 2021 2:18 PM EDT

LINKED ASSISTANTS (1): COVID-19 Crisis Communications

Search Plus

Turn any content into answers

- Create Q&A experiences in minutes
- Sync with websites and data sources for always up-to-date answers
- Handle even complex questions with inclusive, contextual responses

Add search skill

21. Enter **COVID19 Discovery** for the **Name**.

Add search skill

Skills can be combined to improve your assistant's capabilities.

Create skill

Name

COVID19 Discovery

Name your skill; for example, Account application or Personal banking.

Description (optional)

Add a description for this skill

Continue

22. Watson Assistant will pre-fill the associated Discovery instance. Click on the radio button next to **COVID19 English** and click **Next**.

← Back

Search Skill/COVID19 Discovery

Choose a discovery instance to connect to

Watson Discovery-fg

Choose which collection you want to use ⓘ [Create new collection](#) +

Collection name
<input checked="" type="radio"/> COVID-19 English (Global) 05-05-2021 6:06:54 PM

Cancel Next

23. For the **Configure result content**, leave the mappings unchanged.

Search Skill/COVID19 Discovery

Cancel Create

Configure result content

Map your data schema from Discovery to the title, body, and URL fields below to define what results will be surfaced to end users in the preview

Title

title | Example: Will new guidelines for heart failure affect you? × ▾

Body

text | Example: Want probiotics but dislike yogurt? Try these foods × ▾

URL

metadata.source.url | Example: https://www.health.harvard.edu/diseases-and-conditions/treatments-for-covid-19 × ▾

Preview ▶

24. Scroll down. You have the option to (1) change the Message returned by the chat bot when searching the collection, (2) change the Message returned when no results are found, and (3) change the message returned when there is a connectivity issue. No changes are necessary.

Define the text your search skill will display to the end user

Message No results found Connectivity issue

Text to display

I searched my knowledge base and found this information which might be useful:

25. Click on **Preview** to try out the search interface.

← Back

Search Skill/COVID19 Discovery

Cancel Create

Configure result content

Map your data schema from Discovery to the title, body, and URL fields below to define what results will be surfaced to end users in the card results.

Body

text | Example: Hydroxychloroquine is primarily used to treat malaria and several inflammatory diseases, including lupus and rhe... x v

Title

title | Example: Is hydroxychloroquine safe and effective for treating COVID-19? x v

URL

metadata.source.url | Example: https://www.health.harvard.edu/diseases-and-conditions/treatments-for-covid-19 x v

Preview >

26. Enter **What are the tests for COVID19?** and press the <Enter> key.

Preview

I searched my knowledge base and found this information which might be useful:

Will new guidelines for heart failur...

Want probiotics but dislike yogurt? Try these foods

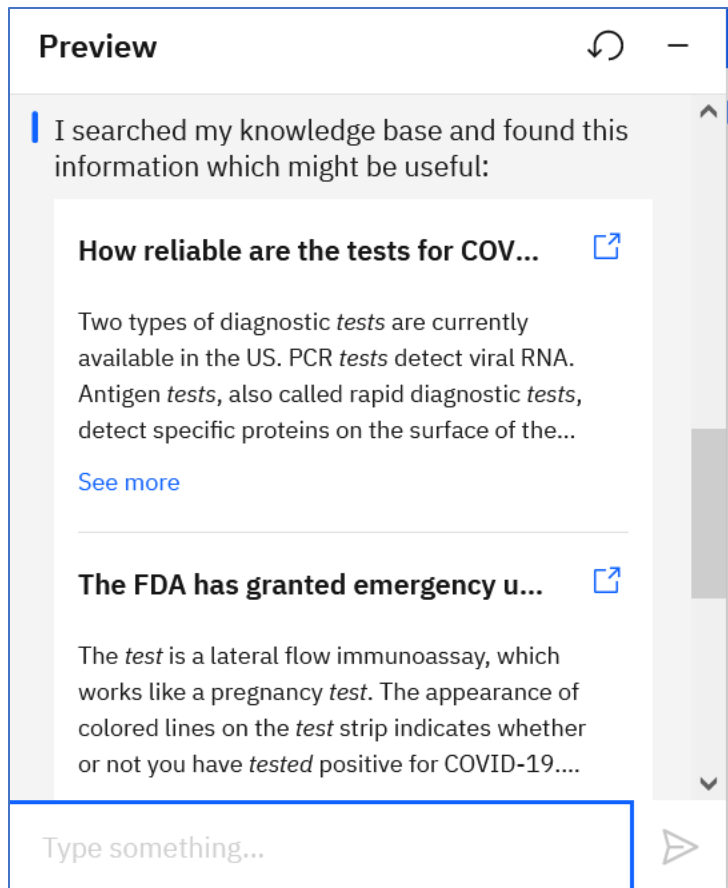
What is serologic (antibody) testin...

A serologic test is a blood test that looks for antibodies created by your immune system. There are many reasons you might make antibodies, the most important of which is to...

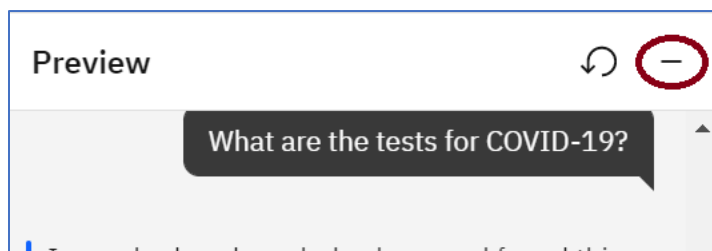
[See more](#)

What are the tests for COVID19?

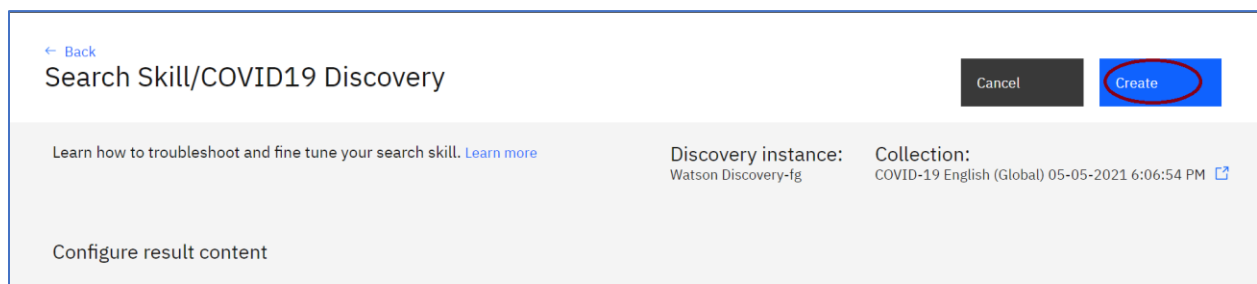
27. The response is shown below.



28. Click the minimize icon (-) to remove the Preview panel.



29. Click **Create** to create the search skill.



Exercise 5: Create Cloud Functions

IBM Cloud Functions are a Functions-as-a-Service (FaaS) platform based on Apache OpenWhisk. You can run your application code without servers, scale it automatically, and pay nothing when not in use. We are going to create a Cloud Function that calls the Covid-19 API from Johns Hopkins to determine the total number of COVID-19 cases.

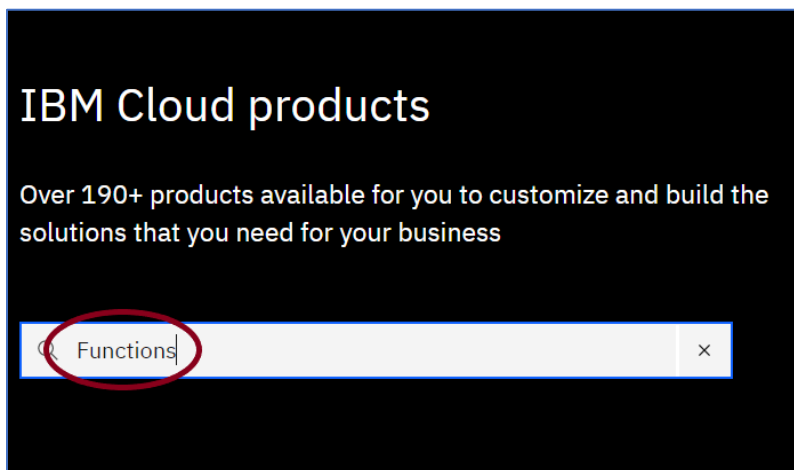
1. Click on the **Watson Service Page** browser tab.



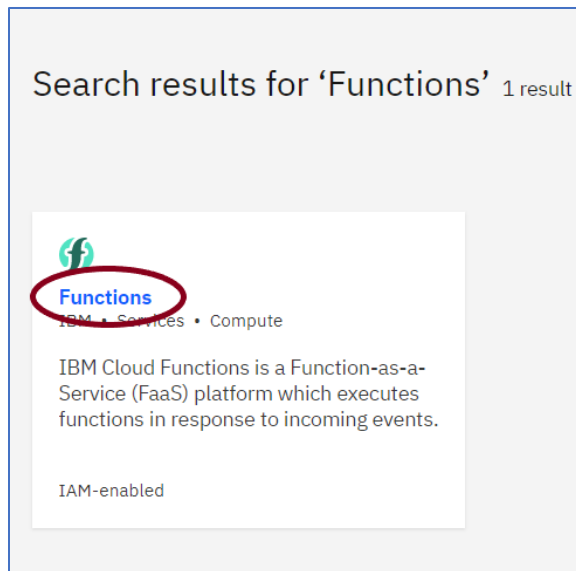
2. Click on **Catalog**.



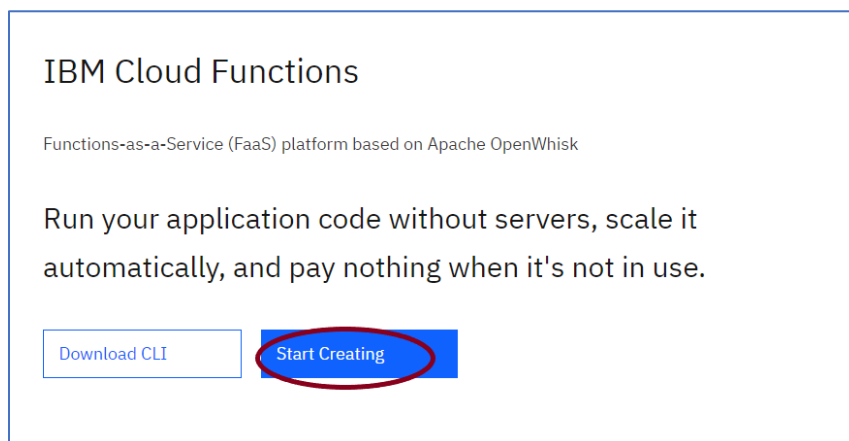
3. Type in **Functions** in the **Search** text box and press the <Enter> key.



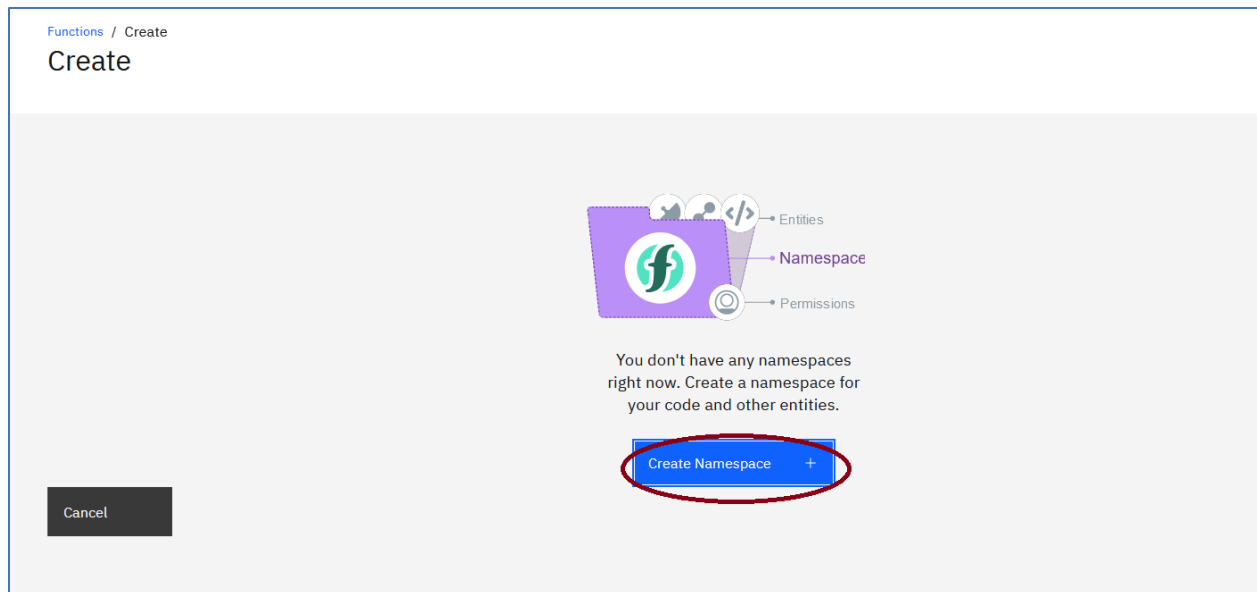
4. Click on the **Functions** tile.



5. Click **Start Creating**.



6. You may get a pop-up to create a namespace. If so, click **Create Namespace**. Otherwise skip to step 9.



7. Click **Create**.

Create a Namespace

Namespaces contain entities (e.g. actions and triggers) and belong to a resource group. You can give users access to your Functions entities using namespaces.
[View Terms and Conditions](#)

Name

Namespace-a7g

Choose resource group

Default

Choose location to deploy in

Dallas

Description

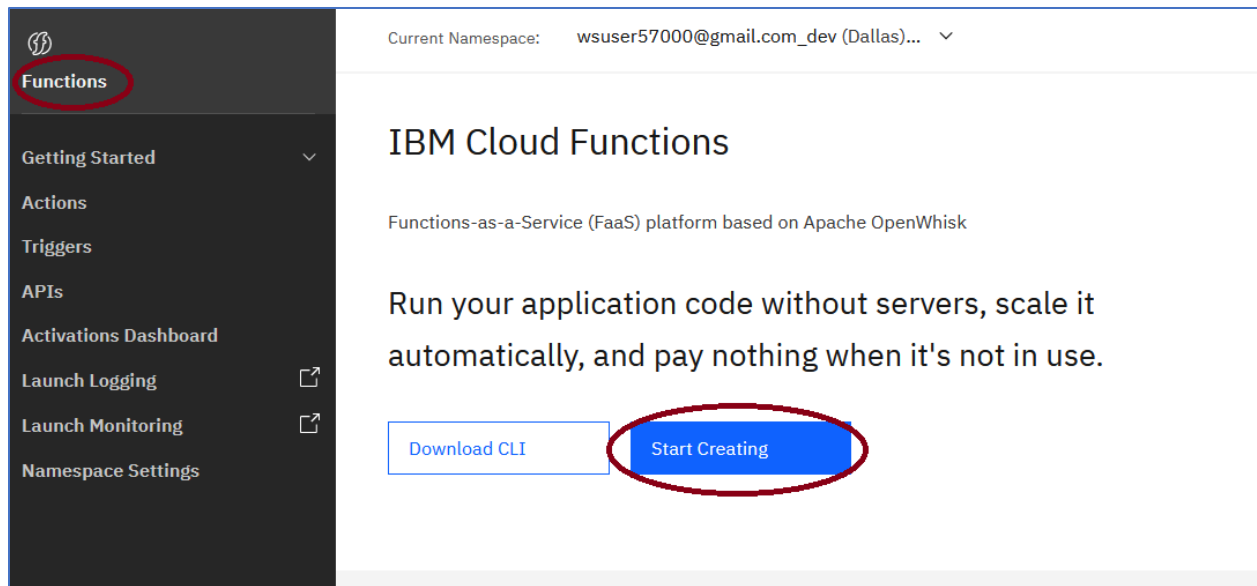
Add a description to your namespace

Pricing Plan

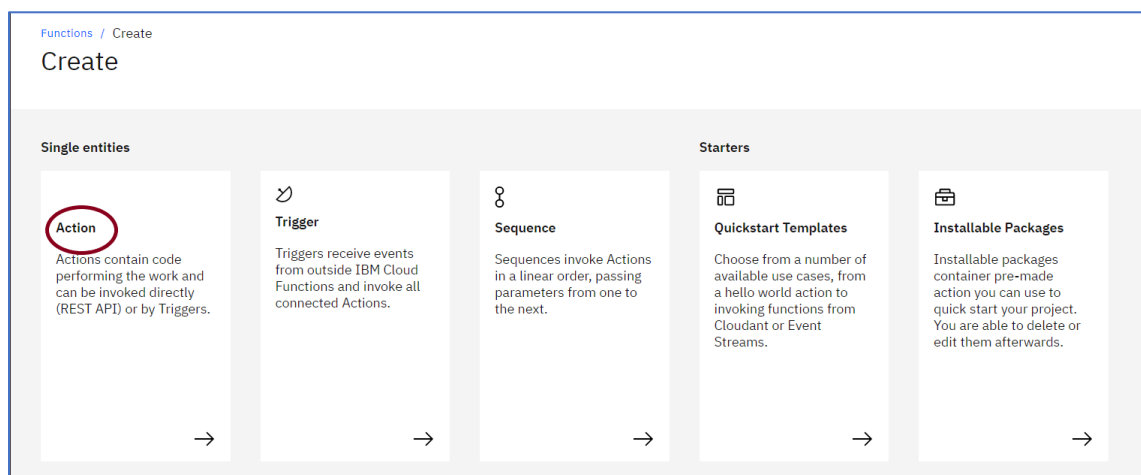
Plan	Base
Pricing	Free
Features	Create serverless applications Only pay for code execution \$0.000017 per second of execution, per GB of memory allocated Free Tier: 400,000 GBs (GiGibyte Seconds) per month

Cancel [Create](#)

8. Click **Functions** and then **Start creating**.



9. Click **Action**.



10. Enter **COVID-19-News** for the **Action Name**, select **Node.js 12** for the **Runtime**, and click **Create**.

Functions / Create / Action

Create Action

Actions contain your function code and are invoked by events or REST API calls.

[Learn more about Actions](#)

[Learn more about Packages](#)

Action Name
COVID-19-News

Enclosing Package
(Default Package) Create Package

Runtime
Node.js 12

Looking for Java, .NET or Docker? [Docker](#) Actions can be created with the [CLI](#)

Previous Cancel Create

11. Copy and paste the code from [action/covid-webhook.js](#) and click **Save**.

Code ⓘ Node.js 10 Edit mode - press ESC to exit Reset Save

```

1 - /**
2  *
3  * main() will be run when you invoke this action
4  *
5  * @param Cloud Functions actions accept a single parameter, which must be a JSON object.
6  *
7  * @return The output of this action, which must be a JSON object.
8  *
9  */
10 var request = require("request-promise");
11 const DiscoveryV1 = require("watson-developer-cloud/discovery/v1");
12
13 function getRandomInt(max) {
14   return Math.floor(Math.random() * Math.floor(max));
15 }
16
17 const statesMap = {
18   alaska: "99501:US",
19   alabama: "35801:US",
20   arkansas: "72201:US",
21   american_samoa: "96799:US",
22   arizona: "85001:US",
23   california: "90001:US",
24   colorado: "80201:US",
25   connecticut: "06101:US",
26   district_of_columbia: "20001:US",
27   delaware: "19901:US",
28   florida: "33124:US",
29   georgia: "30301:US",
30   guam: "GU:US",
31   hawaii: "96801:US",
32

```

12. The code will call the COVID-19 API on the [summary endpoint](#). It takes a type and a location parameter. Click on **Invoke with parameters**.

IBM Cloud Search resources and offerings... Q Catalog Docs

Functions / Actions / COVID-19-News

COVID-19-News

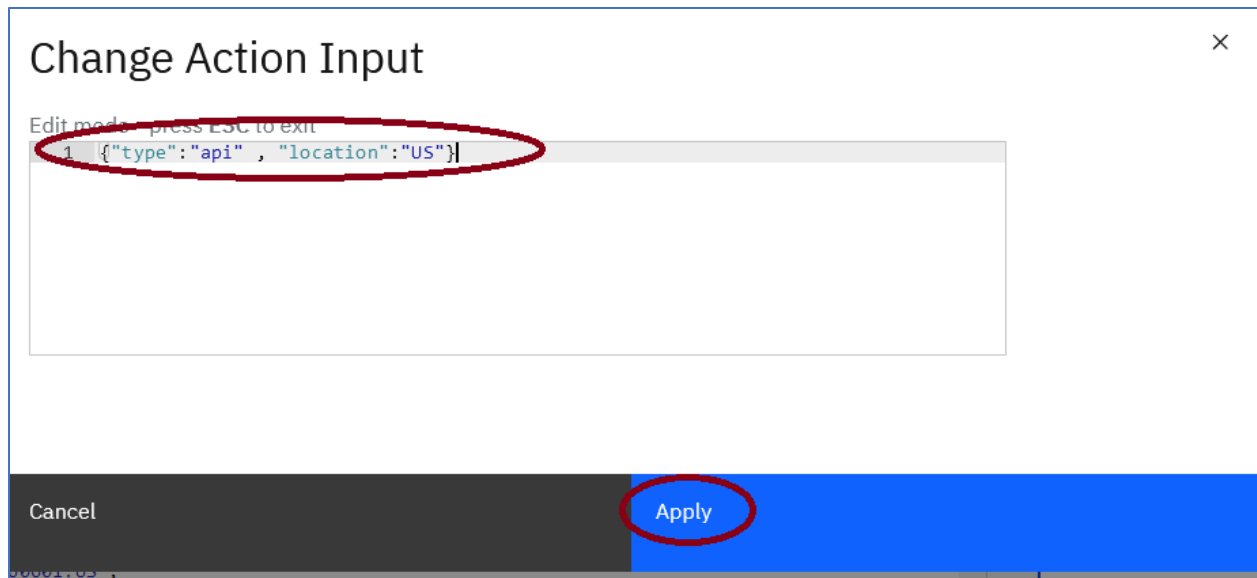
Web Action

Code ⓘ Node.js 10 Invoke with parameters Invoke

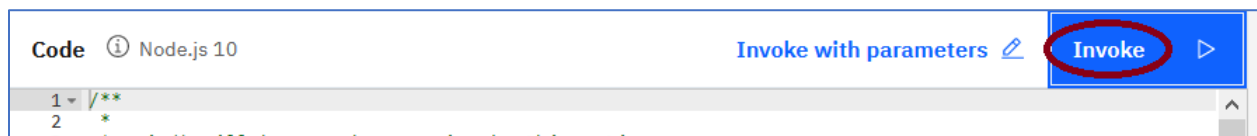
Parameters 1 /**

13. Copy and paste the following into the **Action Input** field and then click **Apply**.

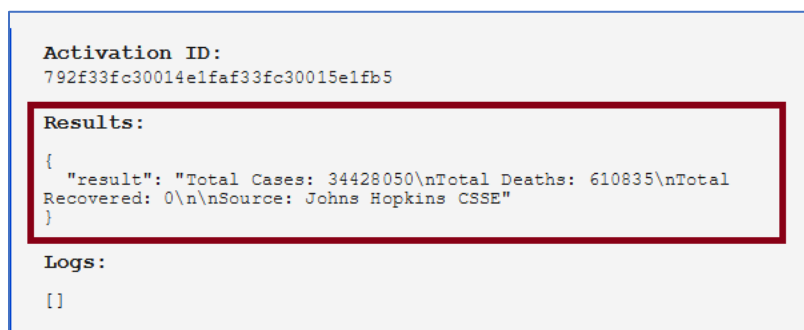
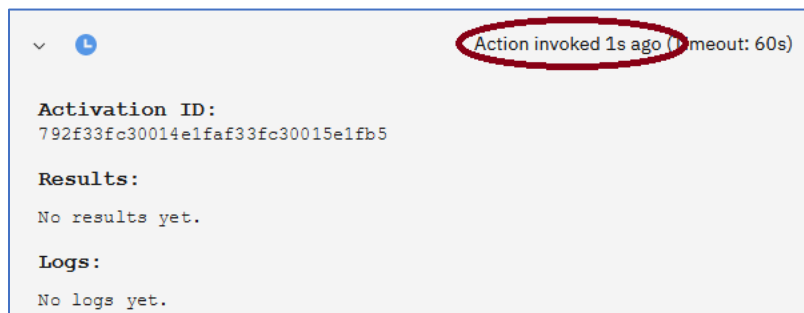
```
{"type": "api" , "location": "US"}
```



14. Click **Invoke**



15. Wait until the invoke completes to view the results.



16. Click on the **Endpoints** tab on the left.

The screenshot shows the IBM Cloud Functions console for a function named 'COVID-19-New'. The 'Endpoints' tab is selected in the left sidebar. The main area displays the function's code, which is a Node.js script. The 'Activations' tab on the right shows a successful activation with a response body containing COVID-19 statistics.

```

1 /**
2  *
3  * main() will be run when you invoke this action
4  *
5  * @param Cloud Functions actions accept a single parameter, which must be a JSON object.
6  *
7  * @return The output of this action, which must be a JSON object.
8  */
9
10 var request = require("request-promise");
11 const DiscoveryV1 = require("watson-developer-cloud/discovery/v1");
12
13 function getRandomInt(max) {
14   return Math.floor(Math.random() * Math.floor(max));
15 }
16
17 const statesMap = {
18   alaska: "99501:US",
19   alabama: "35801:US",
20   arkansas: "72201:US",
21   american_samoa: "96799:US",
22   arizona: "85001:US",
23   california: "90001:US",
24   colorado: "80201:US",
25   connecticut: "06101:US",
26   district_of_columbia: "20001:US",
27   delaware: "19901:US",
28   florida: "33124:US",
29   georgia: "30301:US",
30   guam: "GU:US",
31   hawaii: "96801:US",
32 }
  
```

The 'Activations' tab shows a successful activation with a response body containing COVID-19 statistics:

```

{
  "result": {
    "Total Cases": 192000,
    "Total Deaths": 10000,
    "Recovered": 100000,
    "Source": "Johns Hopkins CSSE"
  }
}
  
```

17. Click on **Enable as a Web Action**, then click **Save**. Copy and paste the http url to a Notepad file. Add `.json?blocking=true` to the end of the url, as shown in blue below.

The screenshot shows the IBM Cloud Functions console for a function named 'COVID-19-News'. The 'Endpoints' tab is selected in the left sidebar. The main area displays the 'Web Action' configuration, including the 'Enable as Web Action' checkbox, 'Raw HTTP handling' checkbox, and the 'HTTP Method' table. The 'URL' field is highlighted with a red circle. A Notepad window is open in the foreground, showing the URL with the '.json?blocking=true' suffix added.

Web Action

☒ Enable as Web Action

☐ Raw HTTP handling

HTTP Method	Auth	URL
ANY	Public	https://us-south.functions.appdomain.cloud/api/v1/web/wsuser57000%40gmail.com_dev/default/COVID-19-News

REST API

HTTP Method	Auth	URL
POST	API-KEY	https://us-south.functions.cloud.ibm.com/api/v1/namespaces/wsuser57000%40gmail.com_dev/actions/COVID-19-News

CURL

```

curl -u API-KEY -X POST https://us-south.functions.cloud.ibm.com/api/v1/namespaces/wsuser57000%40gmail.com_dev/actions/COVID-19-News?blocking=true
  
```

Notepad content:

```

https://us-south.functions.appdomain.cloud/api/v1/web/wsuser57000%40gmail.com_dev/default/COVID-19-News.json?blocking=true
  
```

Exercise 6: Integrate data sources via a Watson Assistant webhook.

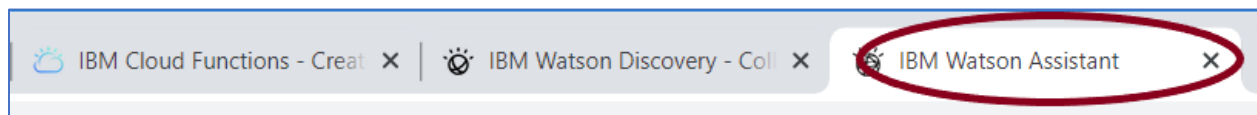
A webhook is a mechanism that allows you to call out to an external program based on something happening in your Watson Assistant dialog skill. When used in a dialog skill, a

webhook is triggered when the assistant processes a node that has a webhook enabled. The webhook collects data that you specify or that you collect from the user during the conversation and save in context variables. It sends the data as part of a HTTP POST request to the URL that you specify as part of your webhook definition. The URL that receives the webhook is the listener. It performs a predefined action using the information that you pass to it as specified in the webhook definition and can optionally return a response.

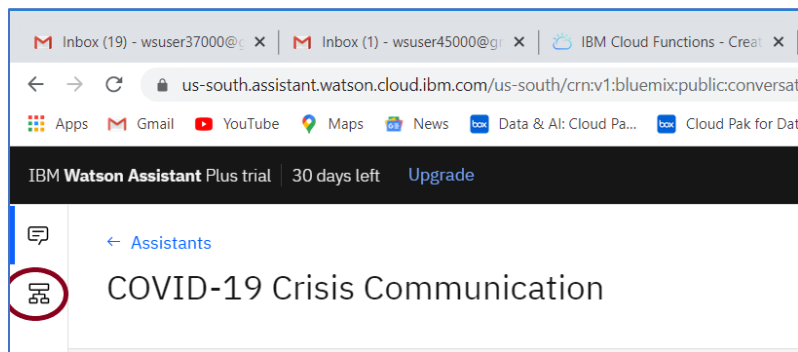
You can use a webhook to do the following types of things:

- Validate information that you collected from the user.
- Interact with an external web service to get information. For example, you might check on the expected arrival time for a flight from an air traffic service or get a forecast from a weather service.
- Send requests to an external application, such as a restaurant reservation site, to complete a simple transaction on the user's behalf.
- Trigger a SMS notification.
- Trigger a IBM Cloud™ Functions web action.

1. Click on **Watson Assistant**.



2. Click on the Skills icon



3. Click on the **CDC COVID FAQ** skill.

The screenshot shows the 'Skills' management page. On the left is a sidebar with icons for chat and skills. The main header is 'Skills' with a sub-header explaining that skills contain training to respond to customer queries. Below this is a blue 'Create skill' button. The main content area displays two skill cards. The first card, 'CDC COVID FAQ', is circled in red. It has a type of 'Dialog — English (US)', was created and updated on Jun 7, 2020 at 1:36 PM EDT, and is linked to the 'COVID-19 Crisis Communication' assistant. The second card, 'My first skill', has the same type, was created and updated on Jun 7, 2020 at 12:13 PM EDT, and is linked to the 'My first assistant'.

Skills

Skills contain the training to respond to your customer queries. Add skills to your assistant and then deploy to your channels.

Create skill

CDC COVID FAQ

TYPE: Dialog — English (US)

CREATED: Jun 7, 2020 1:36 PM EDT UPDATED: Jun 7, 2020 1:36 PM EDT

LINKED ASSISTANTS (1): [COVID-19 Crisis Communication](#)

My first skill

TYPE: Dialog — English (US)

CREATED: Jun 7, 2020 12:13 PM EDT UPDATED: Jun 7, 2020 12:13 PM EDT

LINKED ASSISTANTS (1): [My first assistant](#)

4. Click on **Options**.

The screenshot shows a configuration menu for a skill. The menu items are: 'Intents' (selected), 'Entities' (with a dropdown arrow), 'Dialog', 'Options' (circled in red and highlighted with a blue border, with an upward arrow), 'Webhooks' (circled in red), 'Disambiguation', 'Autocorrection', 'Irrelevance Detection', and 'Intent Detection'.

Intents

Entities ▾

Dialog

Options ▲

Webhooks

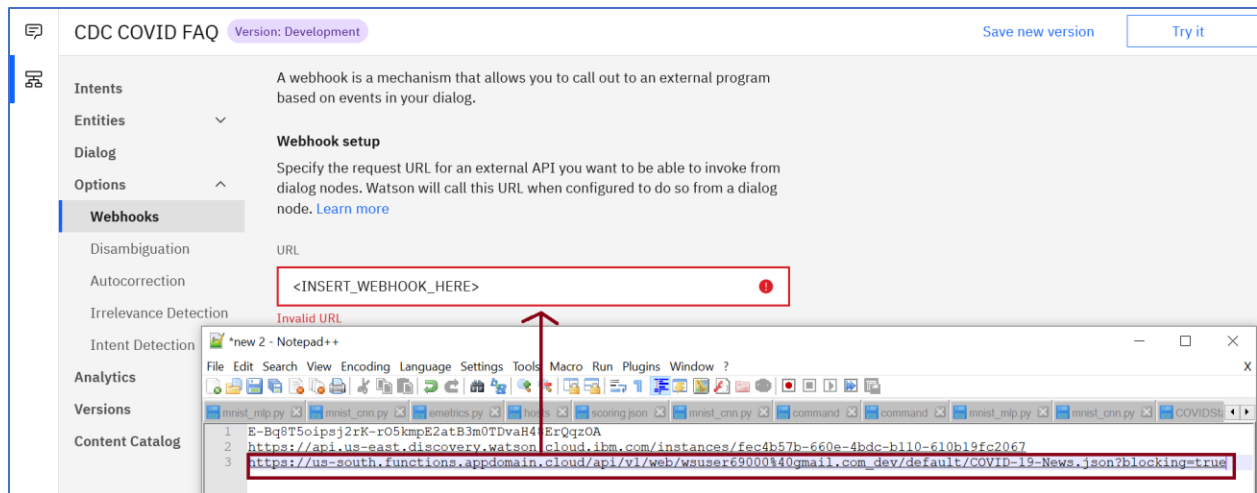
Disambiguation

Autocorrection

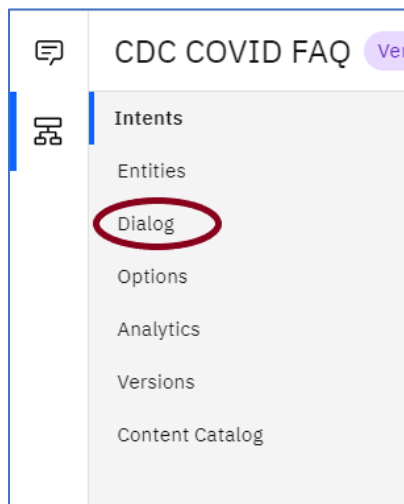
Irrelevance Detection

Intent Detection

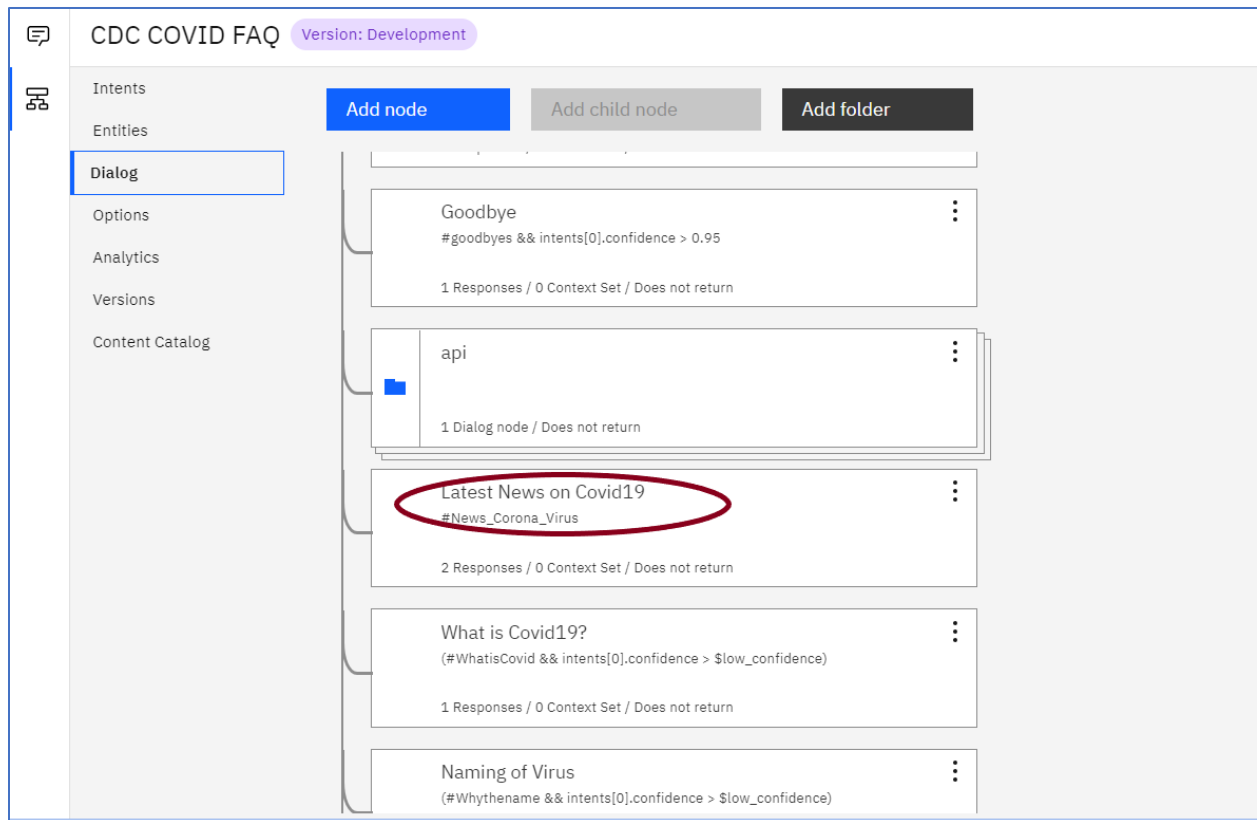
5. Remove the text from the URL field. Then, copy and paste the Web Action url from the Notepad file into the **URL** field.



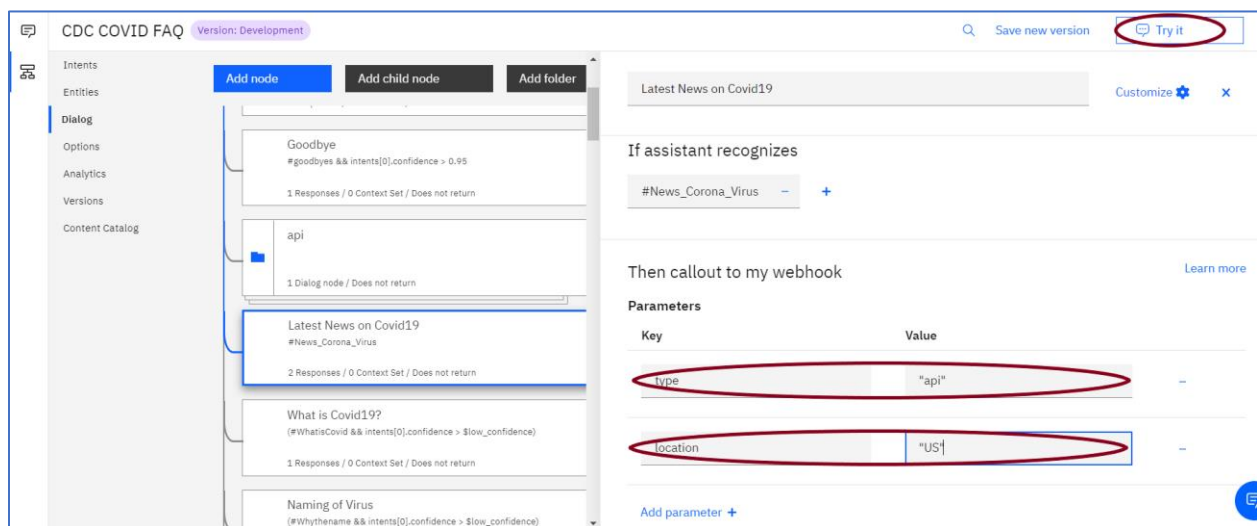
6. Click on **Dialog**.



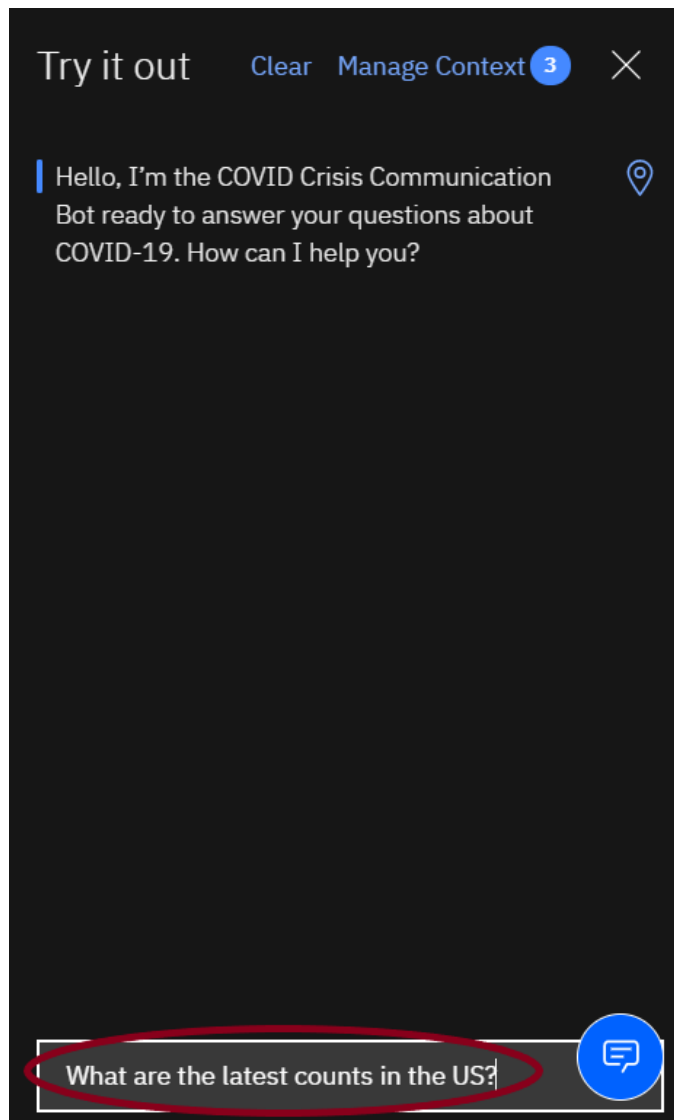
7. Click on **Latest News on Covid19**



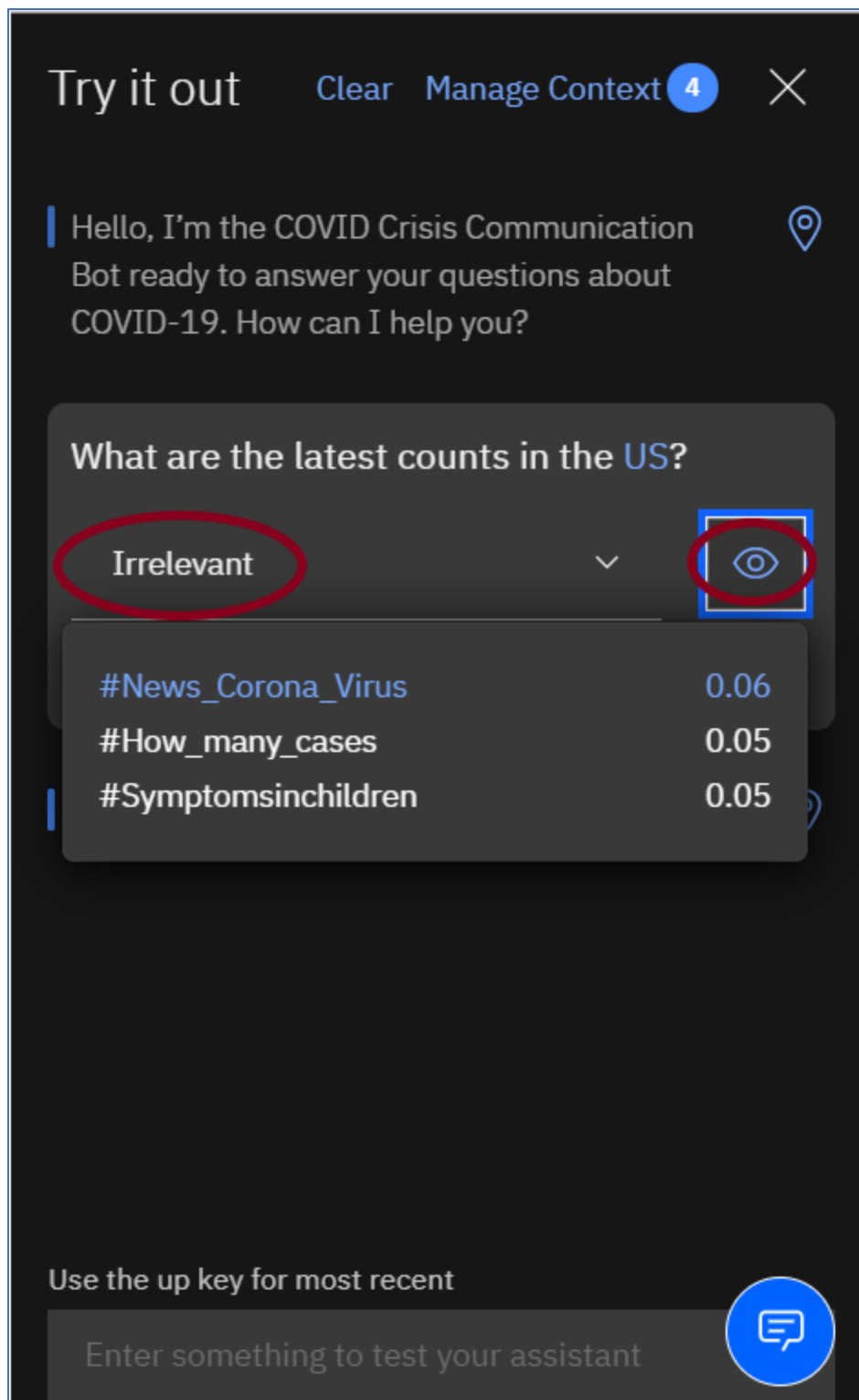
8. Add parameters **type** with value “api”, and **location** with value “US”, then click **Try It**.



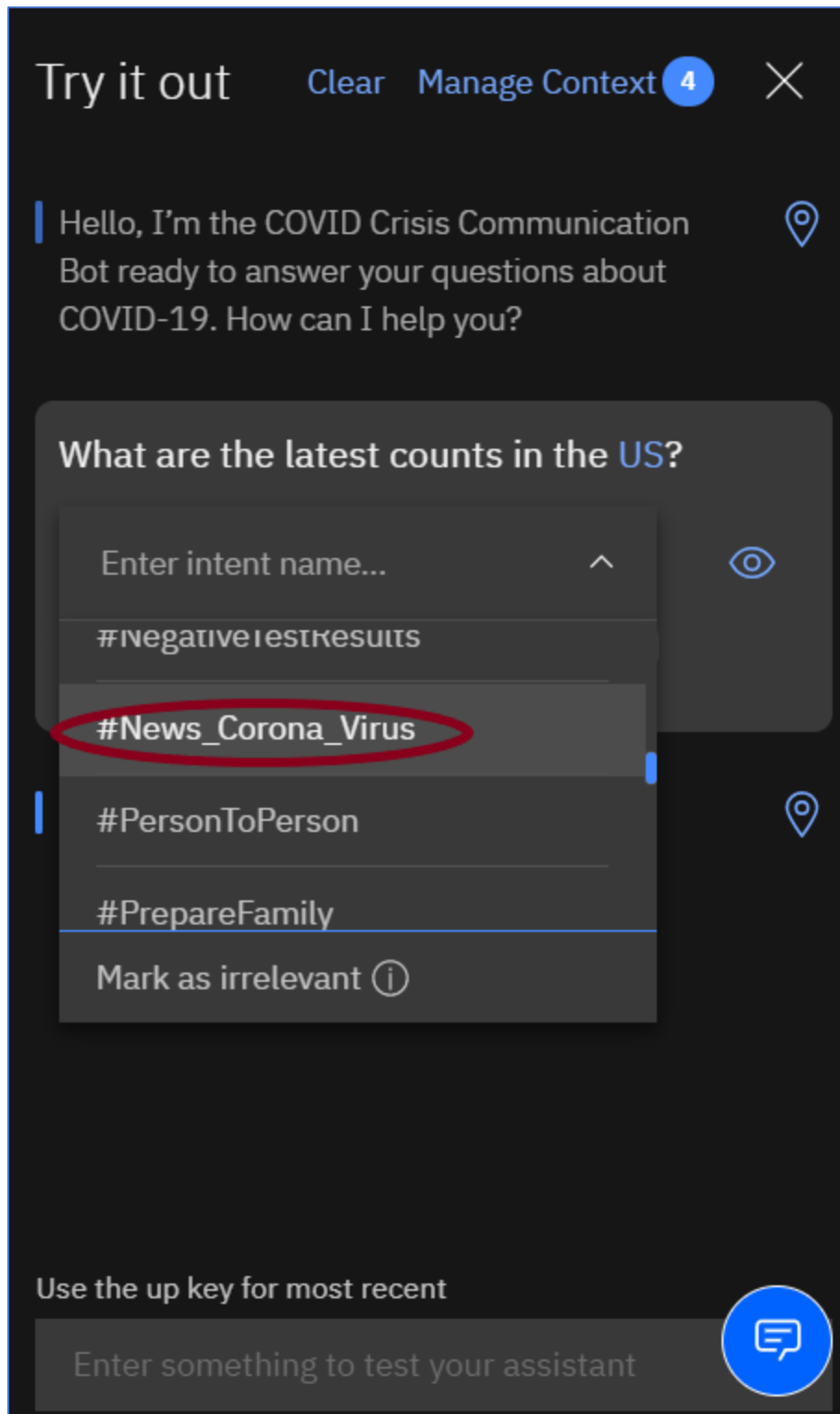
9. Enter “What are the latest counts in the US” and then press <Enter>



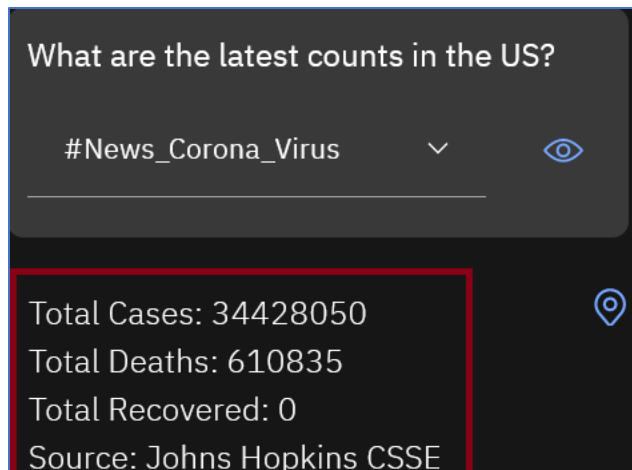
10. The system responds with Irrelevant, meaning that it couldn't find an Intent. By hovering over the eye icon, you can see that #News_Corona_Virus intent had the highest confidence but was below the cutoff threshold for relevance.



11. Click the down arrow icon next to Irrelevant and select the #New_Corona_Virus intent to train the assistant.



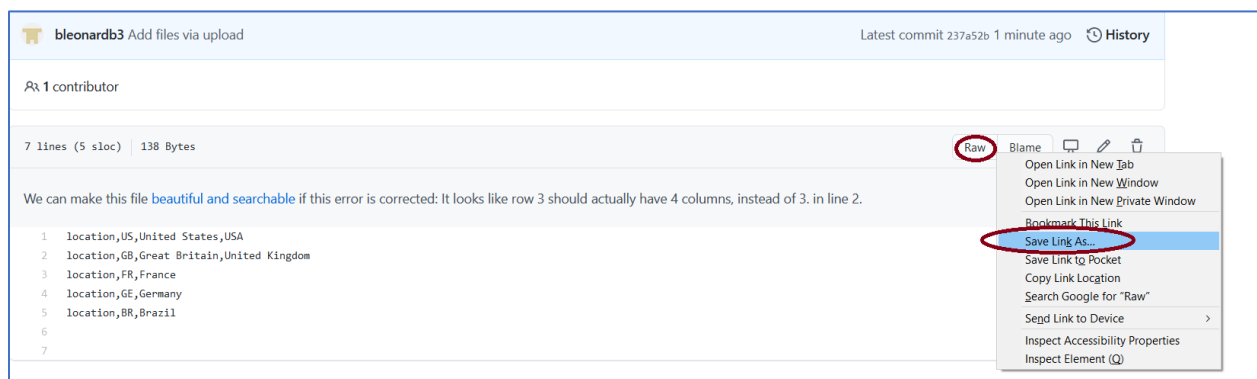
12. Wait until **Watson is Training** message disappears. Retype in the question, “What are the latest counts in the US” and press the <Enter> key. The system responds with the latest counts.



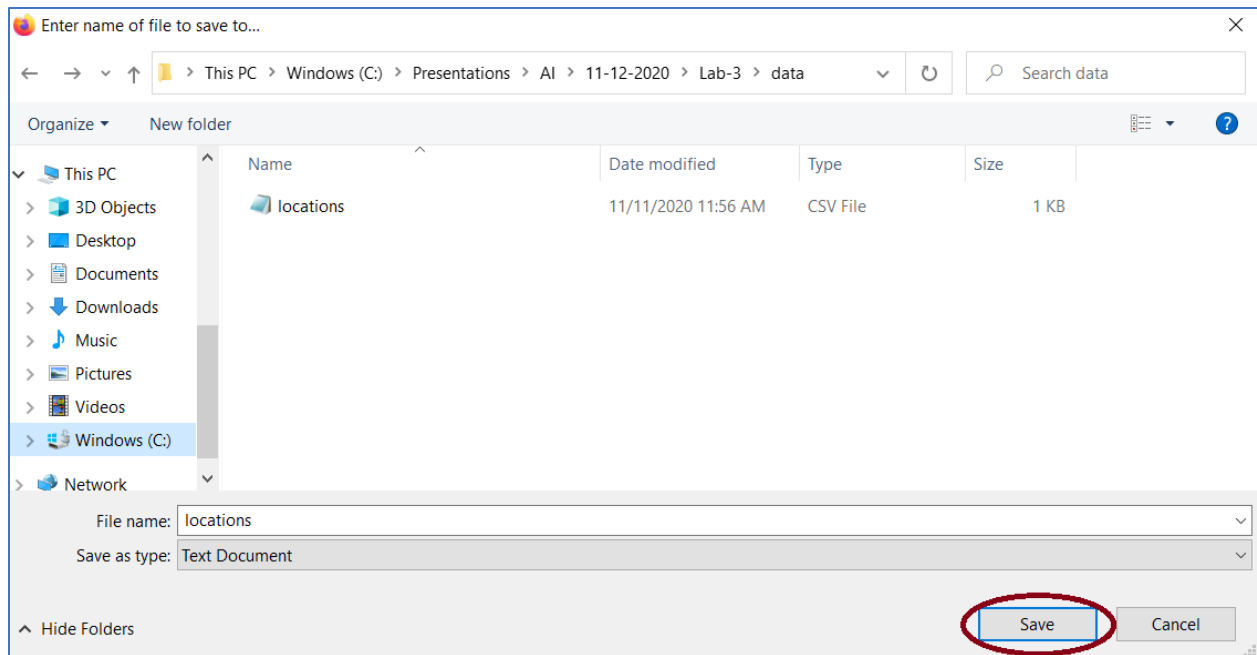
Exercise 7: Extend to other locations

The implementation has currently hardcoded an intent to provide the latest COVID-19 counts for the US. In order to generalize this to other locations, we can create an entity (e.g. @location) and provide a set of values and synonyms. We would then assign the @location value to a context variable (\$location) that would be used as the parameter to query the API.

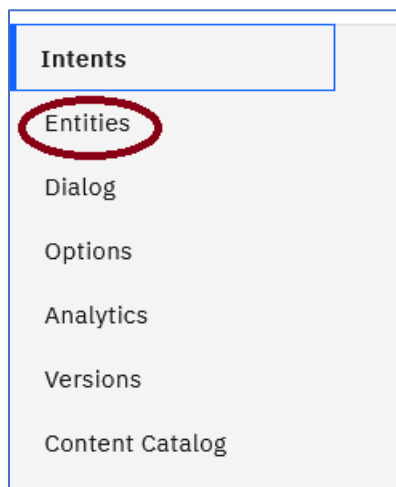
1. Click [here](#) to download an entity import file that contains values for the US, Great Britain, France, Germany, and Brazil.
2. Right-click on **Raw**, then click on **Save link as ...**



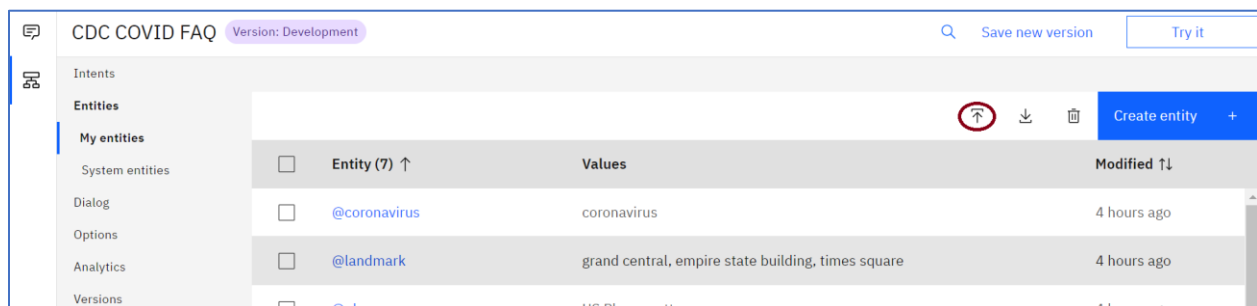
3. Navigate to the location that you want to save the file then click **Save**.



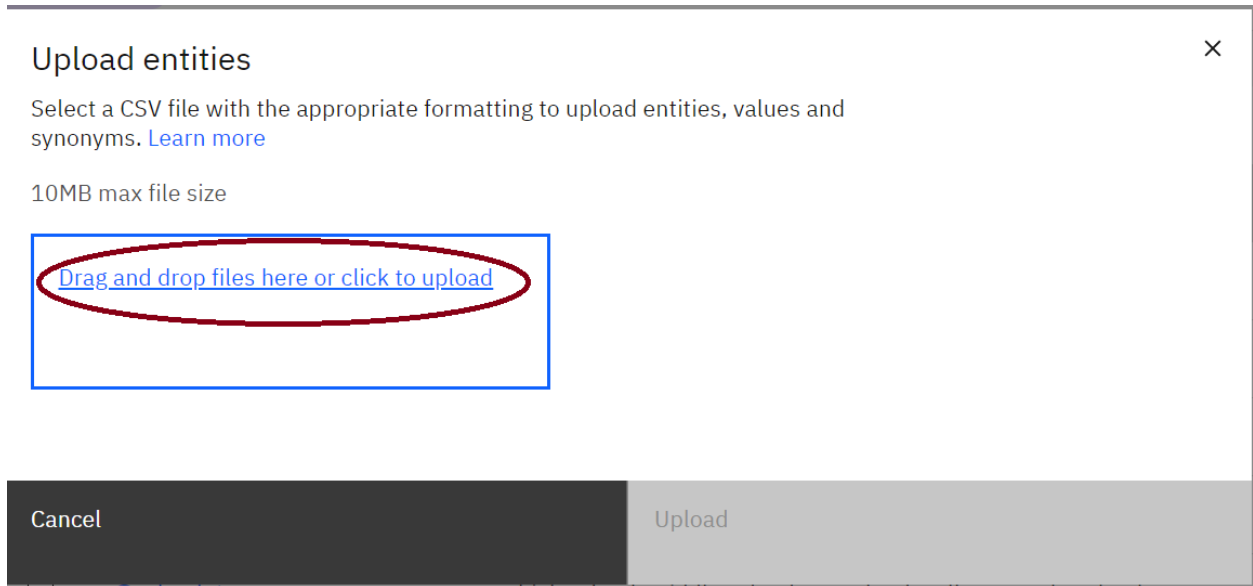
4. Go back to the Watson Assistant, and click on **Entities**.



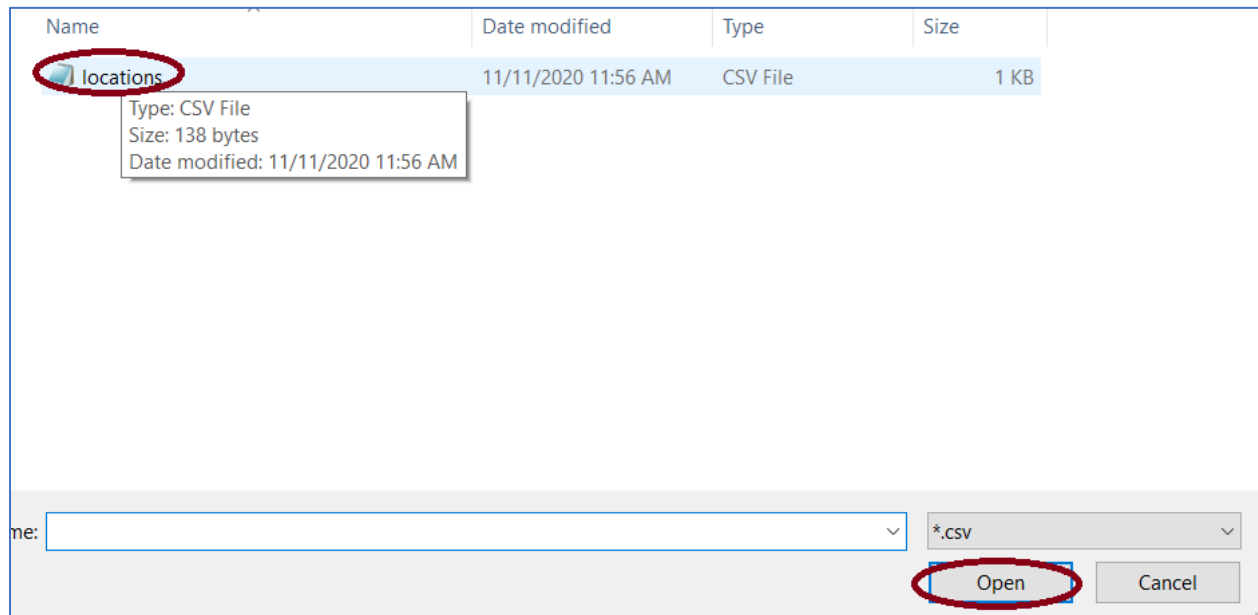
5. Click on the Upload icon 



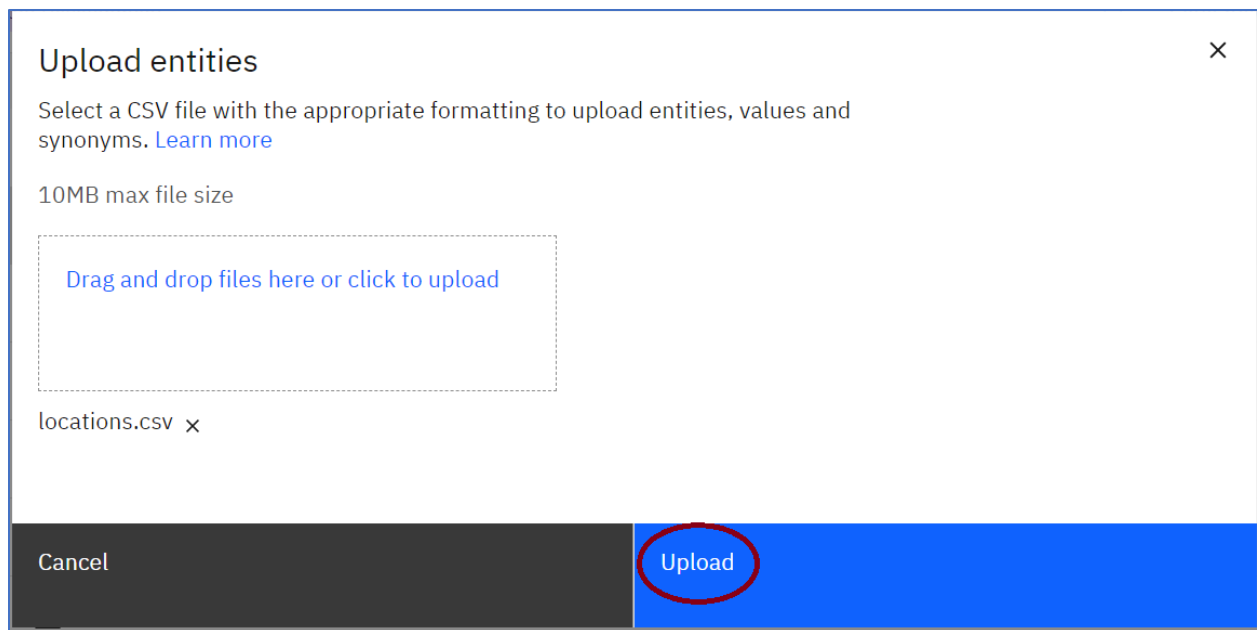
6. Click on Drag and drop files here...



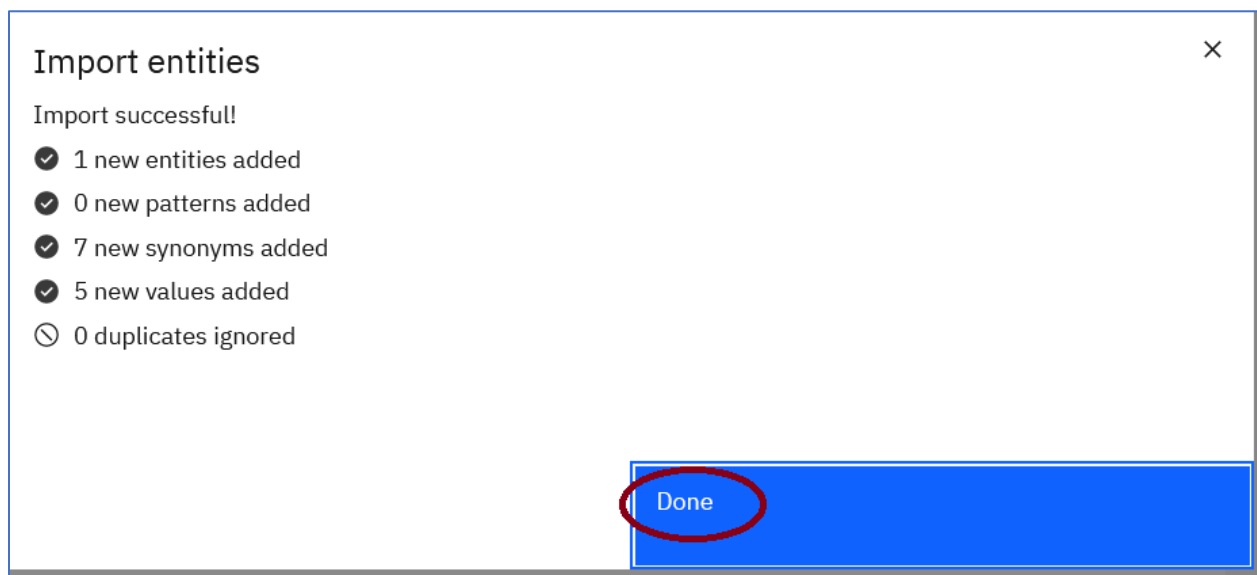
7. Navigate to where you saved the locations file, select the file, and click **Open**.



8. Click **Upload**.



9. Click **Done**.



10. Location values have been imported. Click on Dialog.

CDC COVID FAQ Version: Development Save new version

Intents

Entities

My entities

System entities

Dialog

Options

Analytics

Versions

Content Catalog

<input type="checkbox"/> Entity (7) ↑	Values	Modified ↑↓
<input type="checkbox"/> @coronavirus	coronavirus	3 days ago
<input type="checkbox"/> @landmark	times square, grand central, empire state building	3 days ago
<input type="checkbox"/> @location	FR, GB, US, BR, GE	a minute ago
<input type="checkbox"/> @phone	US Phone pattern	3 days ago
<input type="checkbox"/> @reply	no, yes	3 days ago
<input type="checkbox"/> @school_type	high school, preschool, college, grade school, middle school	3 days ago
<input type="checkbox"/> @zip_code	@sys-number	3 days ago

11. Click on **Latest News on Covid19**


Latest News on Covid19

#News_Corona_Virus

3 Responses / 0 Context Set / Does not return



12. Change the location value to @location.

If assistant recognizes

#News_Corona_Virus  +

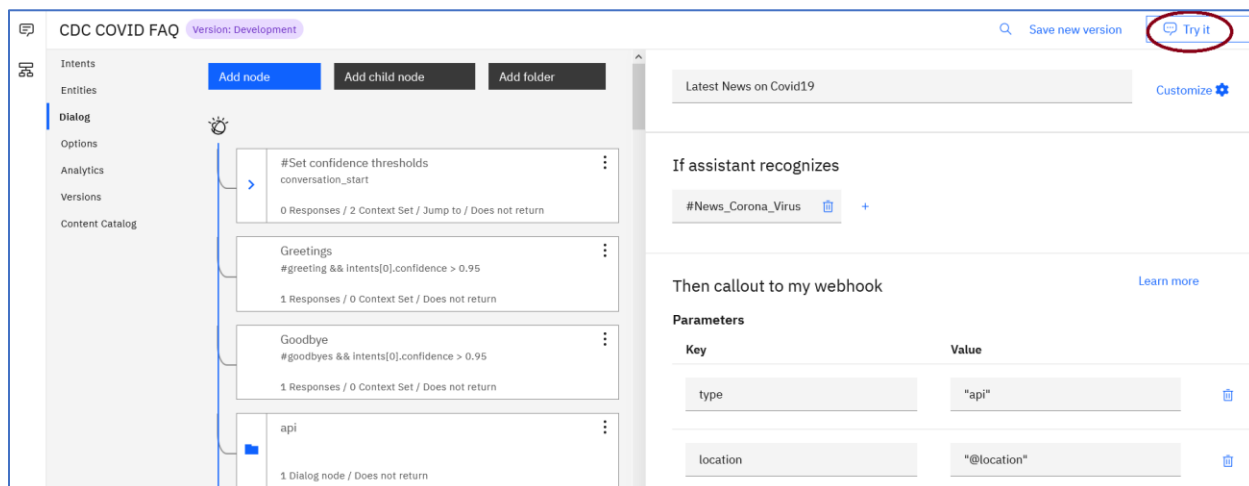
Then callout to my webhook [Learn more](#)

Parameters

Key	Value	
type	"api"	
location	"@location"	

[Add parameter +](#)

13. Click **Try it**



The screenshot shows the IBM Watson Assistant interface for a dialog named "CDC COVID FAQ". The left sidebar contains navigation options: Intents, Entities, Dialog, Options, Analytics, Versions, and Content Catalog. The "Dialog" section is active, showing a list of nodes: "#Set confidence thresholds", "Greetings", "Goodbye", and "api". The "api" node is selected, and its configuration is shown on the right. The configuration includes a trigger "#News_Corona_Virus" and a callout to a webhook. The parameters table is also visible, with keys "type" and "location" and values "api" and "@location" respectively. The "Try it" button in the top right corner is circled in red.

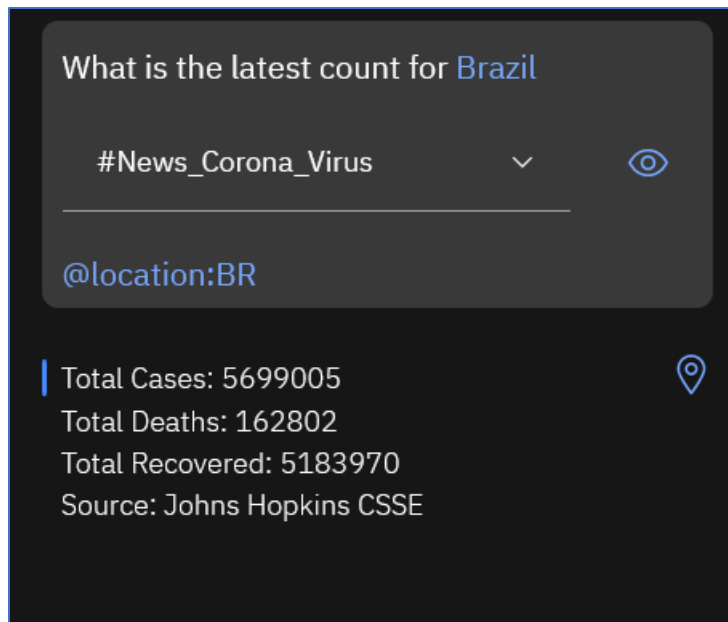
14. Wait until the “Watson is Training Message” disappears, and then type in “What is the latest count in Brazil” and hit the <Enter> key.

Hello, I'm the COVID Crisis Communication Bot
ready to answer your questions about
COVID-19. How can I help you?



What is the latest count for Brazil|

15. The assistant provides the results for Brazil.



You have completed the Lab!

- ✓ Provisioned an instance of Watson Assistant
- ✓ Added a dialog skill to your Watson Assistant instance
- ✓ Connected your Watson Assistant with Watson Discovery
- ✓ Created Cloud Functions
- ✓ Integrated data sources via a Watson Assistant webhook

