

# 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

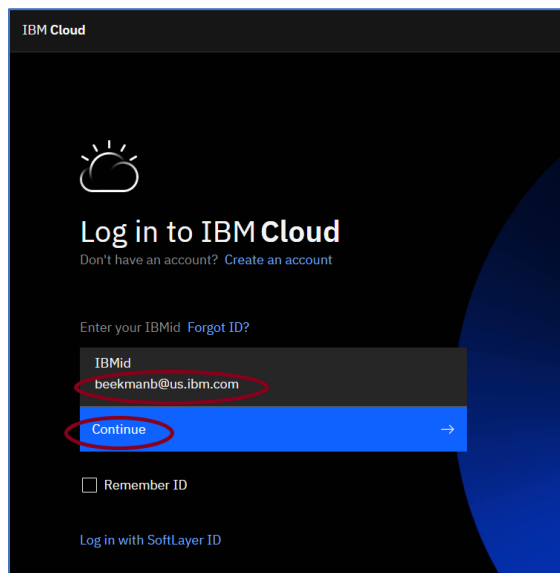
The goal of this lab is to familiarize the user with the Watson Assistant service. Watson Assistant is IBM's AI offering that lets you build, train, and deploy conversation interactions into any application, device, or channel. Watson Assistant can be deployed on any cloud or on-premises environment.

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

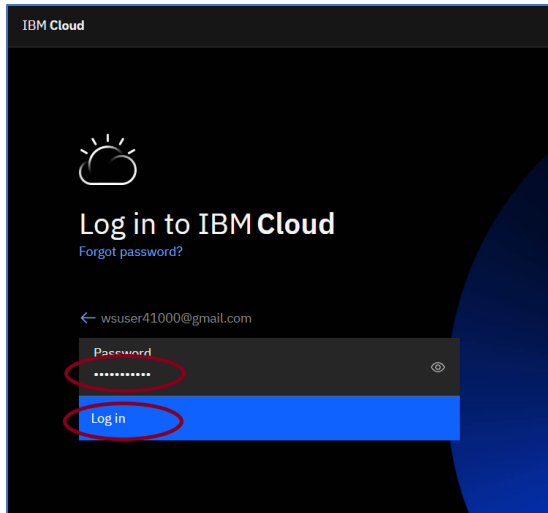
1. Provision an instance of Watson Assistant
2. Add a dialog skill to your Watson Assistant instance
3. Connect your Watson Assistant with Watson Discovery
4. Create Cloud Functions
5. Integrate data sources via a Watson Assistant webhook

## Exercise 1: Create a Watson Assistant Instance

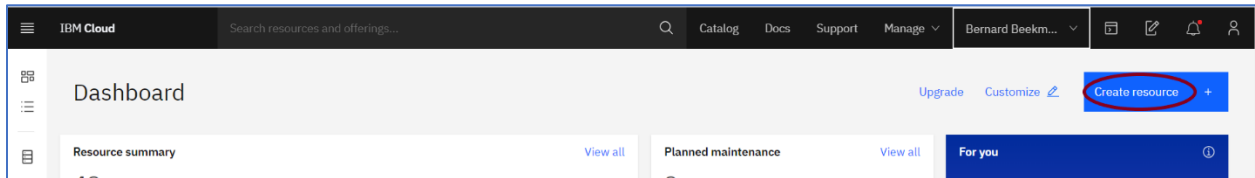
1. Log into your IBM Cloud account by typing in the url **cloud.ibm.com** in your Firefox or Chrome browser.
2. Enter your **IBMid** and click **Continue**.



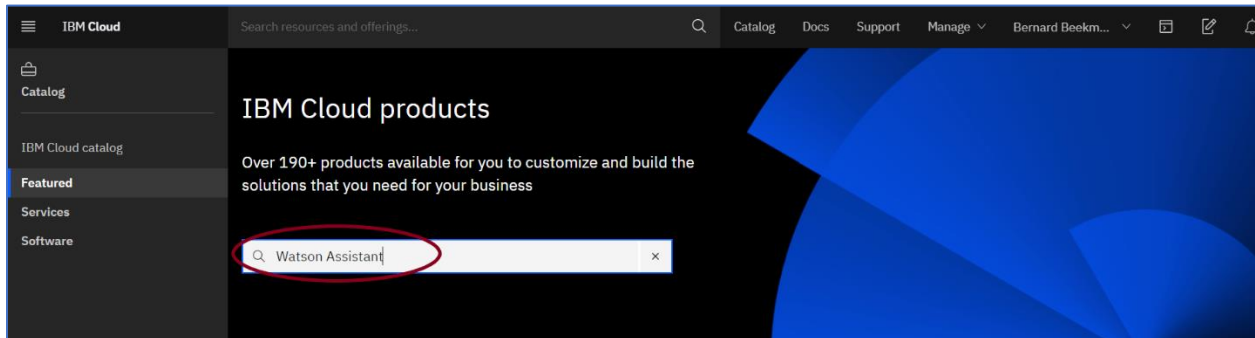
3. Enter your **Password** and click **Log in**.



4. Click **Create Resource**.




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



6. Click on **Watson Assistant**.

## Search results for 'Watson Assistant' 1 result

**Watson Assistant**  
IBM • Services • AI

Watson Assistant lets you build conversational interfaces into any application, device, or channel.

Lite • Free • IAM-enabled

7. Click on the **Plus Trial** and click **Create**.

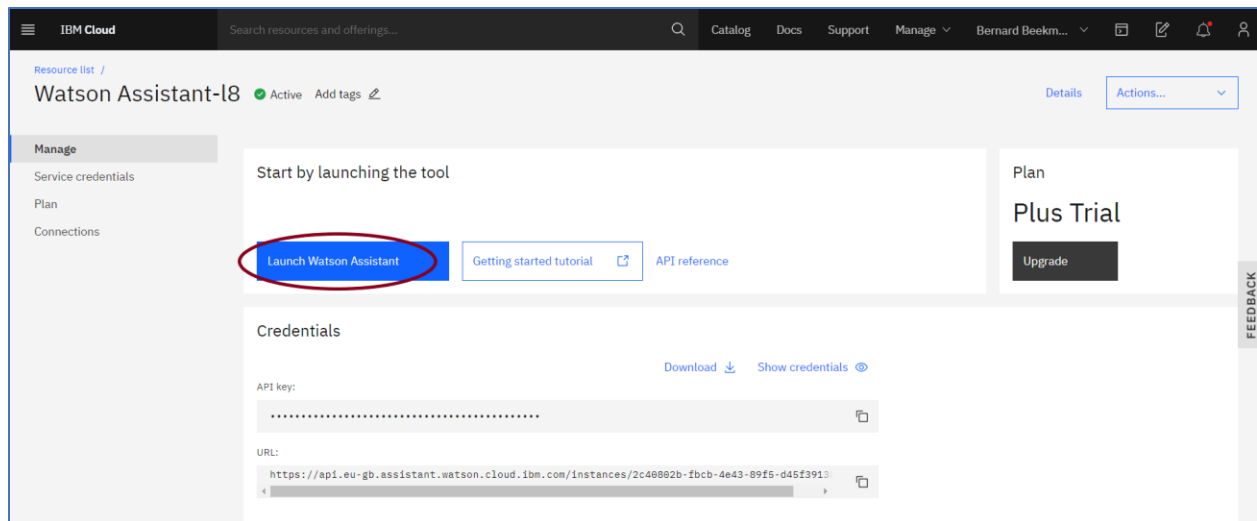
Lite	<b>10,000 Messages/Month</b> AI-Based Intent and Entity Recognition Entity Synonym Recommendations Visual Dialog Edit with Simple Response Types (Text, Options, Images, etc...) Prebuilt Content Available Analytics Dashboard with 7 Days of Storage 5 Dialog Skills, Each with 100 Dialog Nodes Shared Public Cloud	Free
<b>Plus Trial</b>	<b>Everything in Plus, for 30 days, for free!</b> 50,000 Messages 5,000 Users Creation limits consistent with the Lite Plan	Free
Plus	<b>Unlimited Users/Month</b> 50 Dialog and Search skills, Unlimited Dialog Nodes for Dialog skills Web-chat and service Desk Integrations Intent Recommendations Intent Conflict Detection Disambiguation	\$120.00 USD/Thousand Authorized Users
Premium	<b>Everything in Plus, with these additions...</b> Analytics Dashboard with 90 Days of Storage Up to 30 Instances with the ability to share log and analytics data across them Usage and Training Data is Private • Stored in an Isolated Single Tenant Environment	


**Summary**  
**Watson Assistant** **Free**  
Region: Dallas  
Plan: Plus Trial  
Service name: Watson Assistant-qb  
Resource group: Default

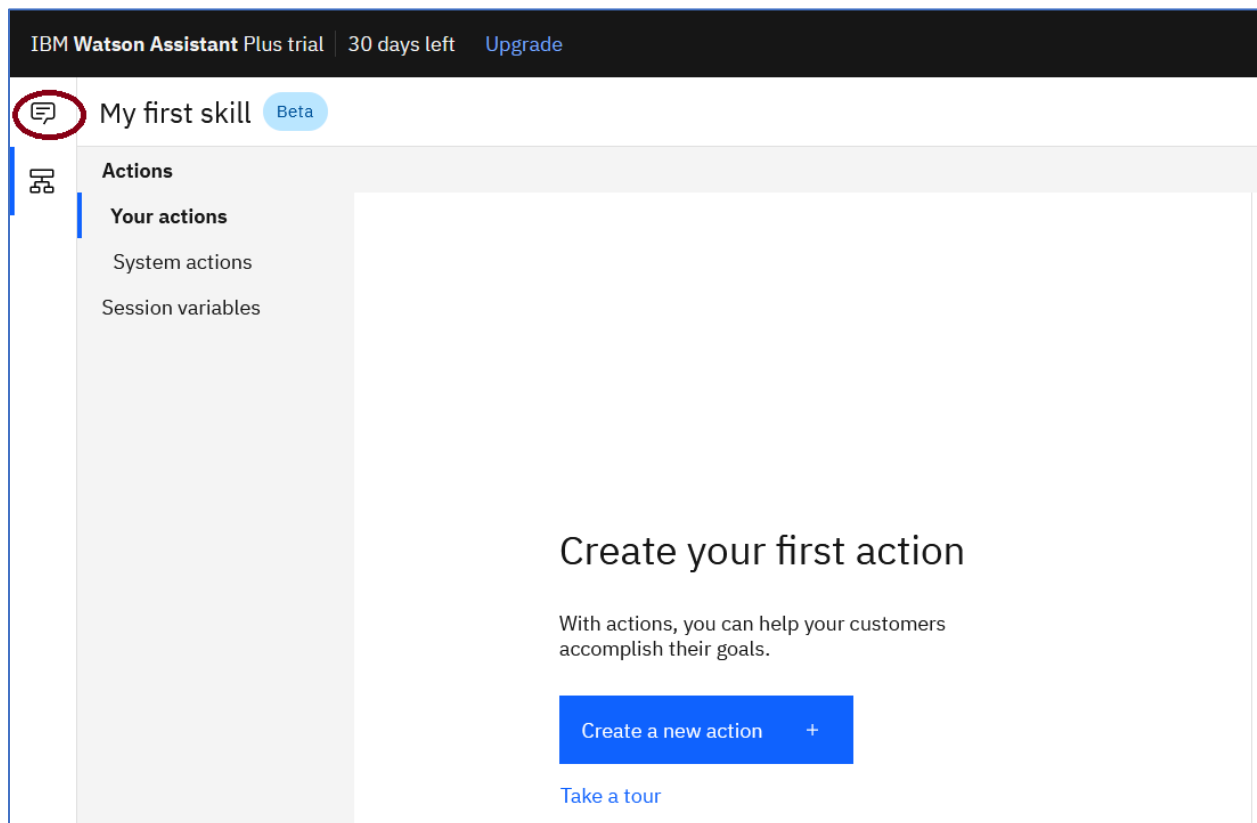
**Create**  
Add to estimate

FEEDBACK

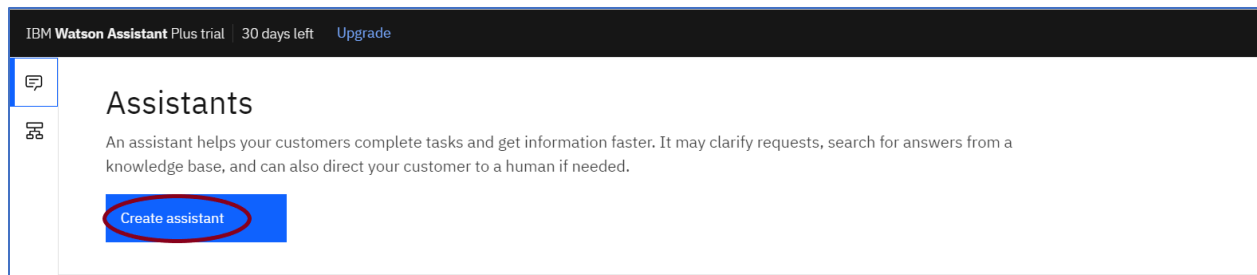
8. Click on **Launch Watson Assistant**.



9. Click on the assistant icon  .



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

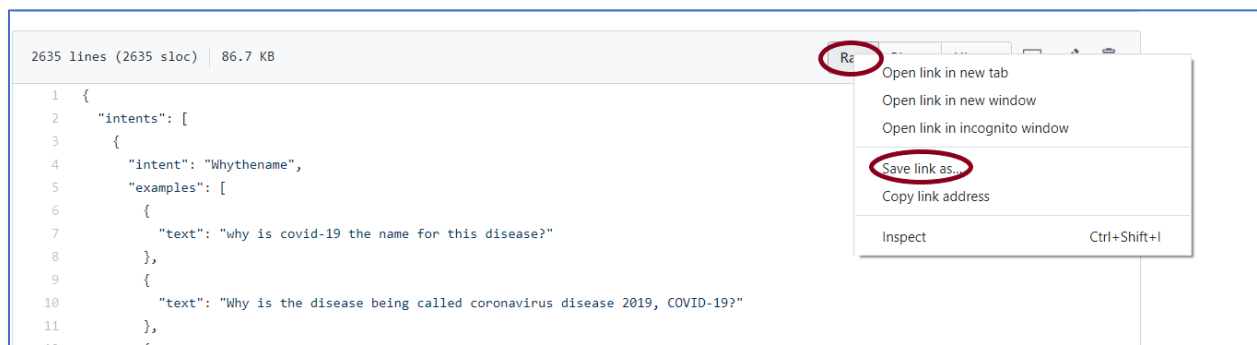


11. Enter **COVID-19 Crisis Communication** for the **Name** and click **Create assistant**.

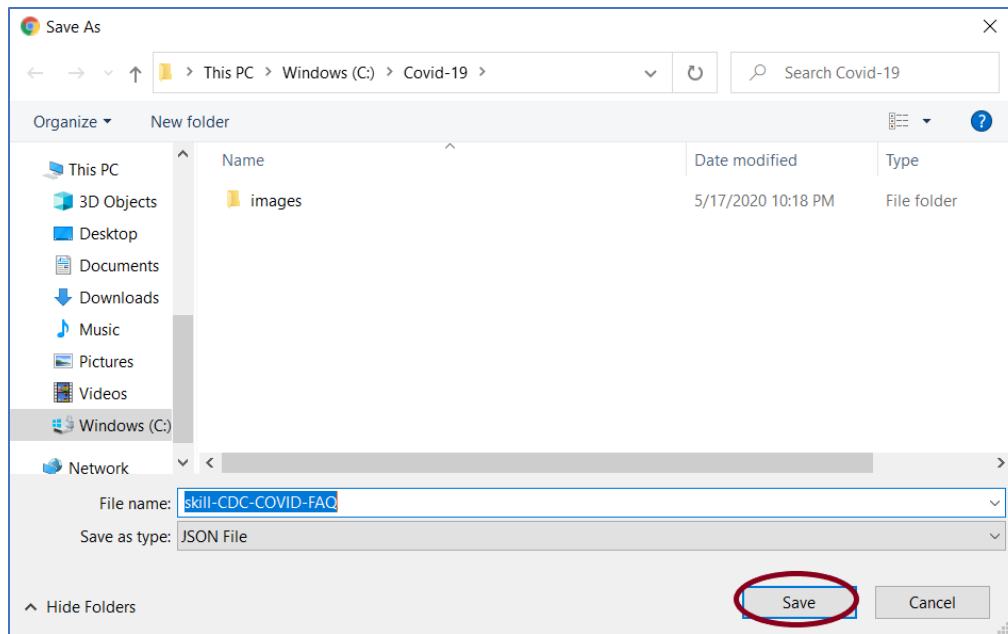
## Exercise 2: Download the COVID-19 FAQ file.

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 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 answering a question 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.

The dialog matches intents (what users say) to responses (what the bot says back). 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. Two types of skills can be created in the assistant.

- The **dialog skill** interprets the user input and directs the flow of the conversation. The dialog gathers any information it needs to respond or perform a transaction on the user's behalf. This skill understands typical questions or requests from users and answers or fulfills them by following a dialog that is scripted by you.
- The **search skill** routes complex customer queries to Watson Discovery that are not handled by the dialog skill. Watson Discovery treats the user input as a search query. It finds 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**

The screenshot shows the 'Skills' page in the Watson Assistant console for an assistant named 'COVID-19 Crisis Communication'. The page is divided into three main sections: 'Actions', 'Dialog', and 'Search'. Each section has a title, a brief description, a list of bullet points, and a blue button to add a skill. The 'Dialog' button is circled in red.

← Assistants

## COVID-19 Crisis Communication

### Actions Beta

**Build conversations easier than ever**

- 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
- Focus more on your customer's goals and experience
- Collaborate and work more intuitively, made so that anybody can build

[Learn more](#)

[Add an actions skill](#)

### Dialog

**Our full-feature conversation builder**

Dialog offers all the smarts, power, and flexibility you've come to trust. Select to keep building with the tools you know and love. [Learn more](#)

[Add dialog skill](#)

### Search Plus

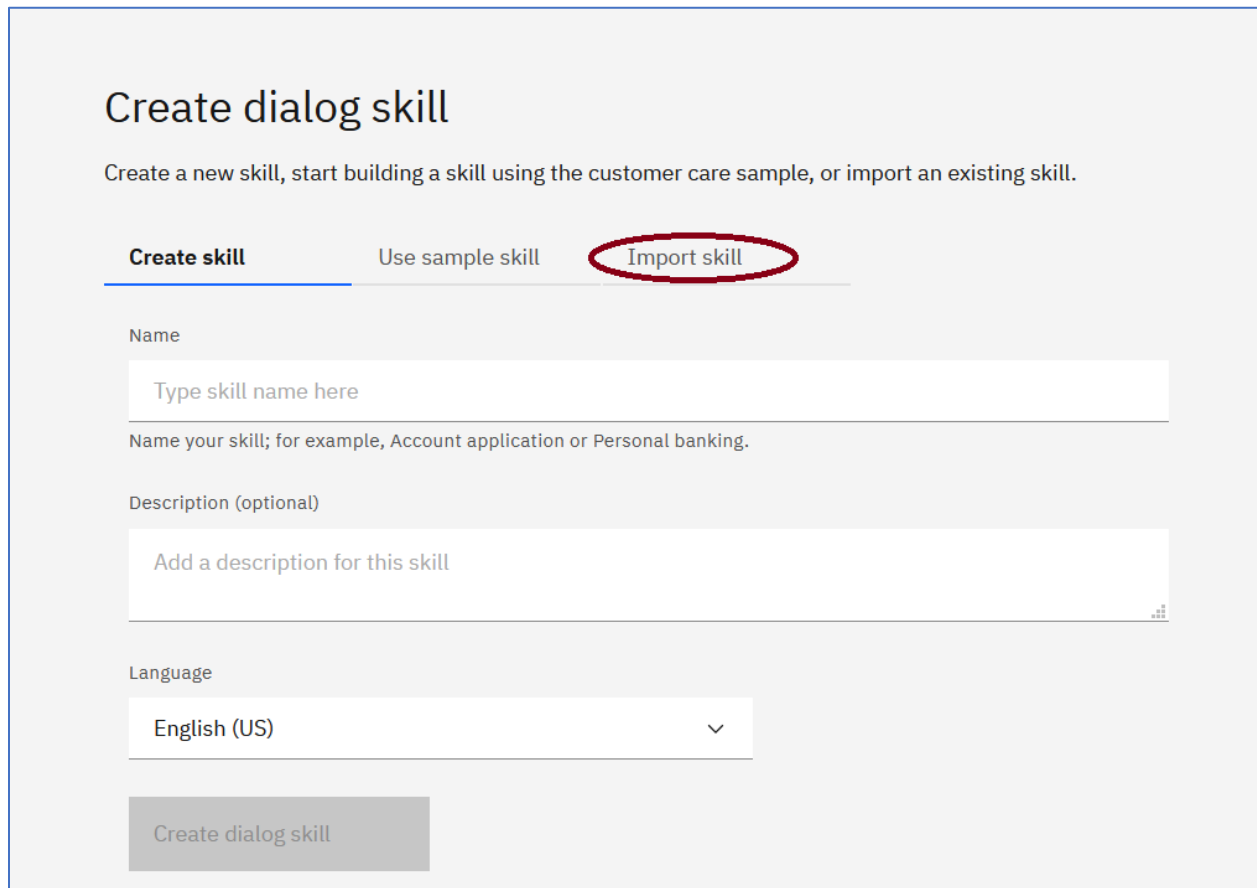
**Turn any content into answers**

- 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

[Watch a brief demonstration](#) ©

[Add search skill](#)

2. Click **Import skill**.



The screenshot shows a web interface titled "Create dialog skill". Below the title is a subtitle: "Create a new skill, start building a skill using the customer care sample, or import an existing skill." There are three tabs: "Create skill", "Use sample skill", and "Import skill". The "Import skill" tab is selected and circled in red. Below the tabs are three input fields: "Name" with a placeholder "Type skill name here", "Description (optional)" with a placeholder "Add a description for this skill", and "Language" with a dropdown menu showing "English (US)". At the bottom is a grey button labeled "Create dialog skill".

## Create dialog skill

Create a new skill, start building a skill using the customer care sample, or import an existing skill.

**Create skill**   Use sample skill   **Import skill**

Name

Type skill name here

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

Description (optional)

Add a description for this skill

Language

English (US) ▼

Create dialog skill

3. Click on **Choose JSON File**.

## Create dialog skill

Create a new skill, start building a skill using the customer care sample, or import an existing skill.

Create skill

Use sample skill

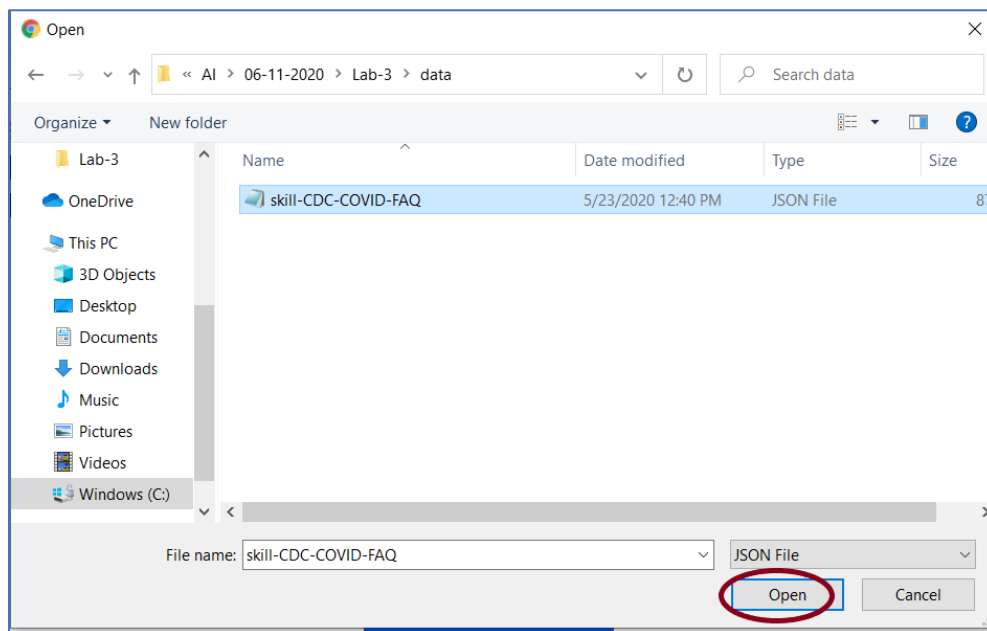
**Import skill**

Select the JSON file for the dialog skill with the data you want to import.

Drag and drop file here or click to select a file

Import

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



5. Click **Import**.

## Create dialog skill

Create a new skill, start building a skill using the customer care sample, or import an existing skill.

Create skill

Use sample skill

**Import skill**

Select the JSON file for the dialog skill with the data you want to import.

Drag and drop file here or click to select a file

skill-CDC-COVID-FAQ.json

×

Import

- 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.

CDC COVID FAQ Version: Development

Intents

Intents (41) ↑	Description	Modified ↑↓	Conflicts ↑↓	Examples ↑↓
<input type="checkbox"/> #AnimalContact	Human - Animal interaction guidance	7 hours ago		7
<input type="checkbox"/> #AttendingFuneral	Funeral attendance guidance	7 hours ago		5
<input type="checkbox"/> #CDC_Response	Info about the CDC	7 hours ago		5
<input type="checkbox"/> #ChildrenAndFaceMasks	Guidance regarding Children wearing Facemas...	7 hours ago		5
<input type="checkbox"/> #ChildrenSocializing	Child Socialization guidance	7 hours ago		6
<input type="checkbox"/> #CommunitySpread	Defining Community Spread	7 hours ago		7

Showing 1-41 of 41 intents

1 1 of 1 pages

8. Scroll down to view the examples.

IBM Watson Assistant Plus trial 20 days left Upgrade

#AttendingFuneral

Last updated: 7 hours ago

User example

Add unique examples of what the user might say. (Pro tip: Add at least 5 unique examples to help Watson understand)

Type a user example here, e.g. I want to pay my credit card bill

Add example Show recommendations

Annotate entities What's this?

User examples (5) ↑	Added ↑↓	Conflicts (0) ↑↓
<input type="checkbox"/> Am I at risk if I go to a funeral or visitation service for someone who died of COVID-19?	7 hours ago	
<input type="checkbox"/> Are funerals safe?	7 hours ago	
<input type="checkbox"/> Can I go to a funeral of someone who died of Corona Virus (COVID-19)?	7 hours ago	

Showing 1-5 of 5 examples

1 1 of 1 pages

Sys-person and sys-location are deprecated. Update your dialog before they are removed. Act now

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

#AttendingFuneral

Last updated: 7 hours ago

User example

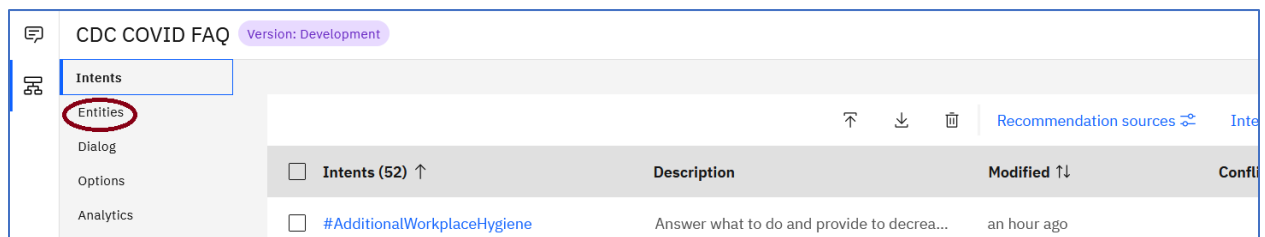
Add unique examples of what the user might say. (Pro tip: Add at least 5 unique examples to help Watson understand)

Type a user example here, e.g. I want to pay my credit card bill

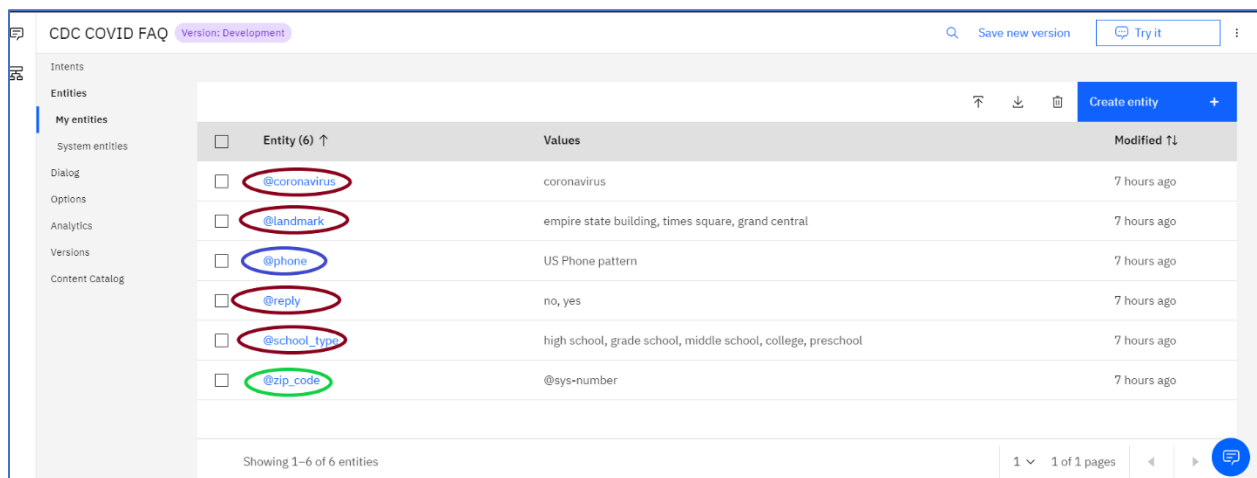
Add example Show recommendations

Annotate entities What's this?

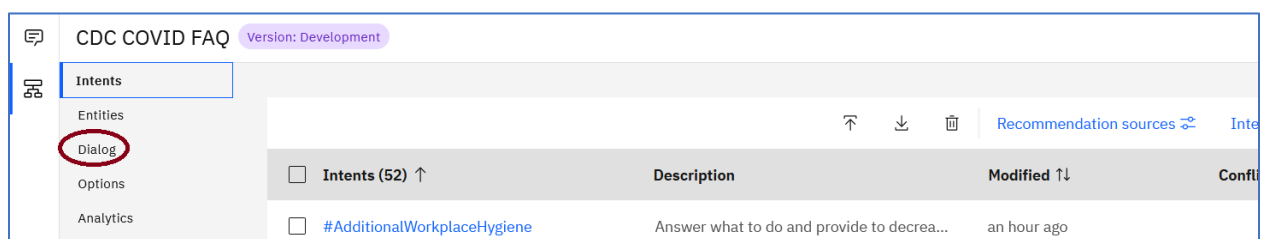
10. Click on **Entities**.



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.

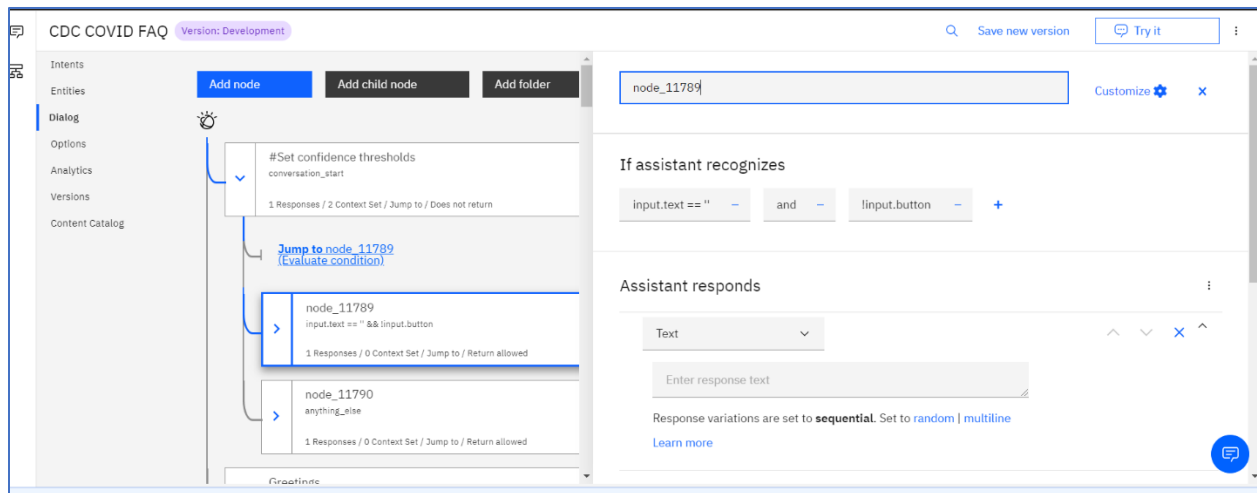



12. Click on the Dialog option.



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

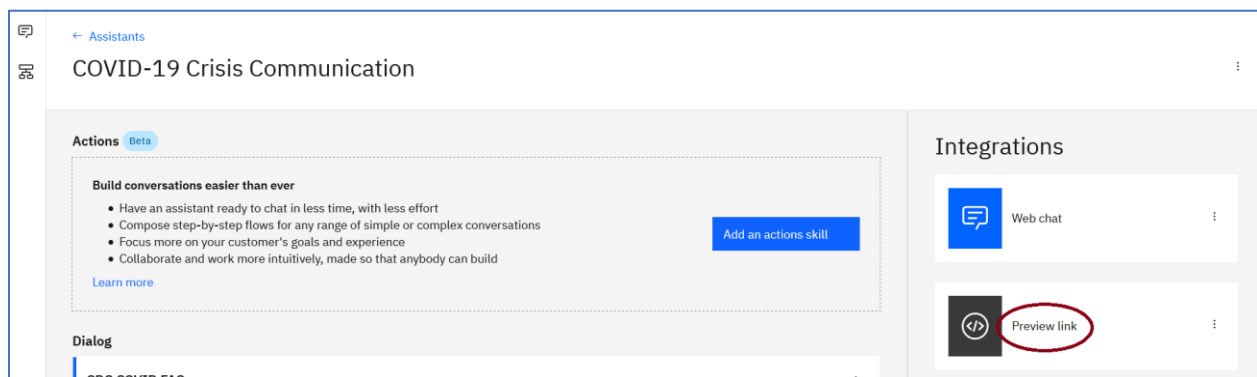




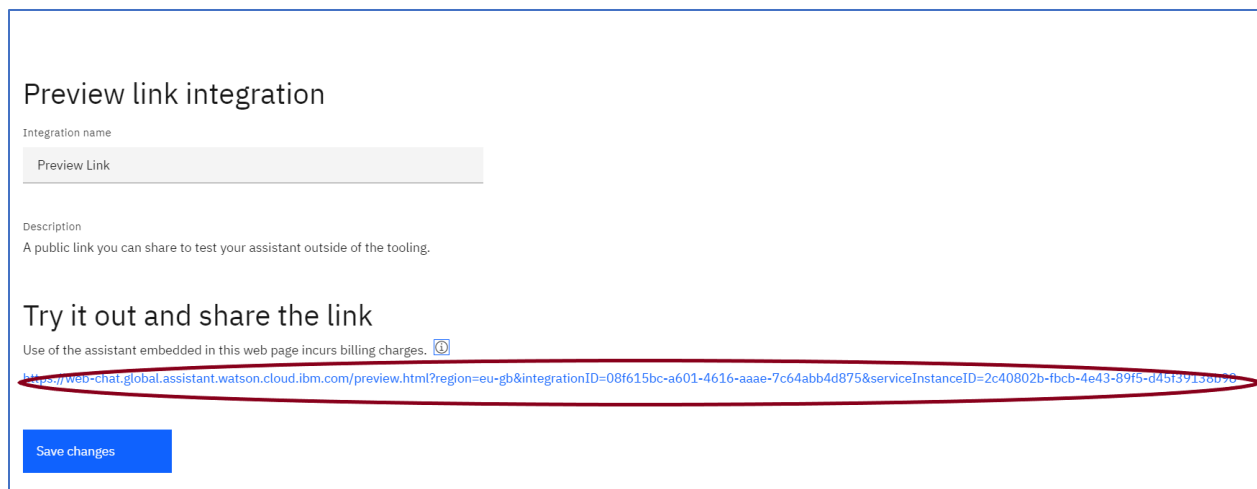
14. Click on the Assistant icon  to return to the All Assistants page.



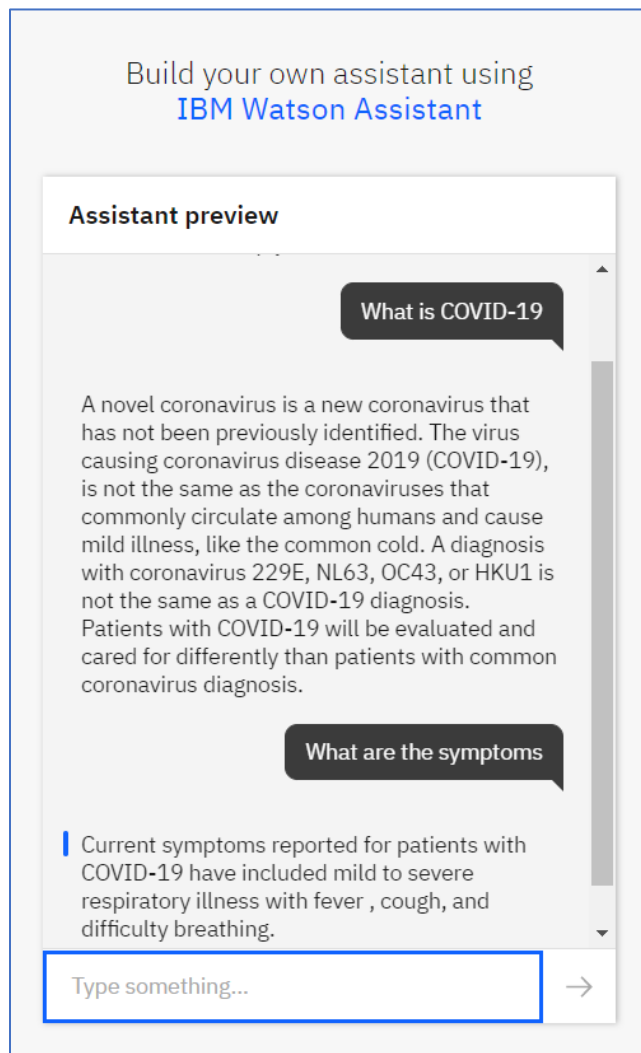
15. Click on **Preview** link.



16. Click link to try out the chatbot.



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. Close the browser tab corresponding to the Assistant preview.  
19. Click **Save changes**.

**Preview link integration**

Integration name

Preview Link

Description

A public link you can share to test your assistant outside of the tooling.

**Try it out and share the link**

Use of the assistant embedded in this web page incurs billing charges. ⓘ

<https://web-chat.global.assistant.watson.cloud.ibm.com/preview.html?region=eu-gb&integrationID=08f615bc-a601-4616-aaae-7c64abb4d875&serviceInstanceID=2c40802b-fbcb-4e43-89f5-d45f39138b98>

Save changes

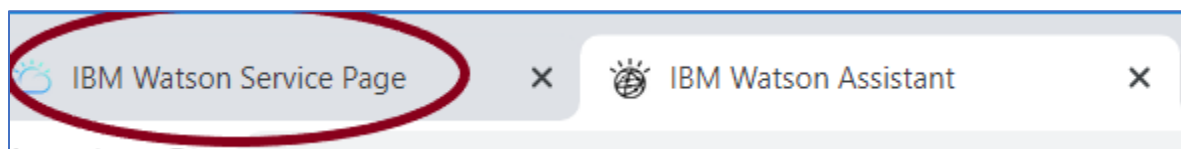
## Exercise 4: Add a Search Skill

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 chatbox uses two different data sources.

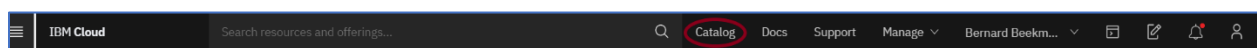
- [Watson Discovery](#)
- [COVID-19 API](#)

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

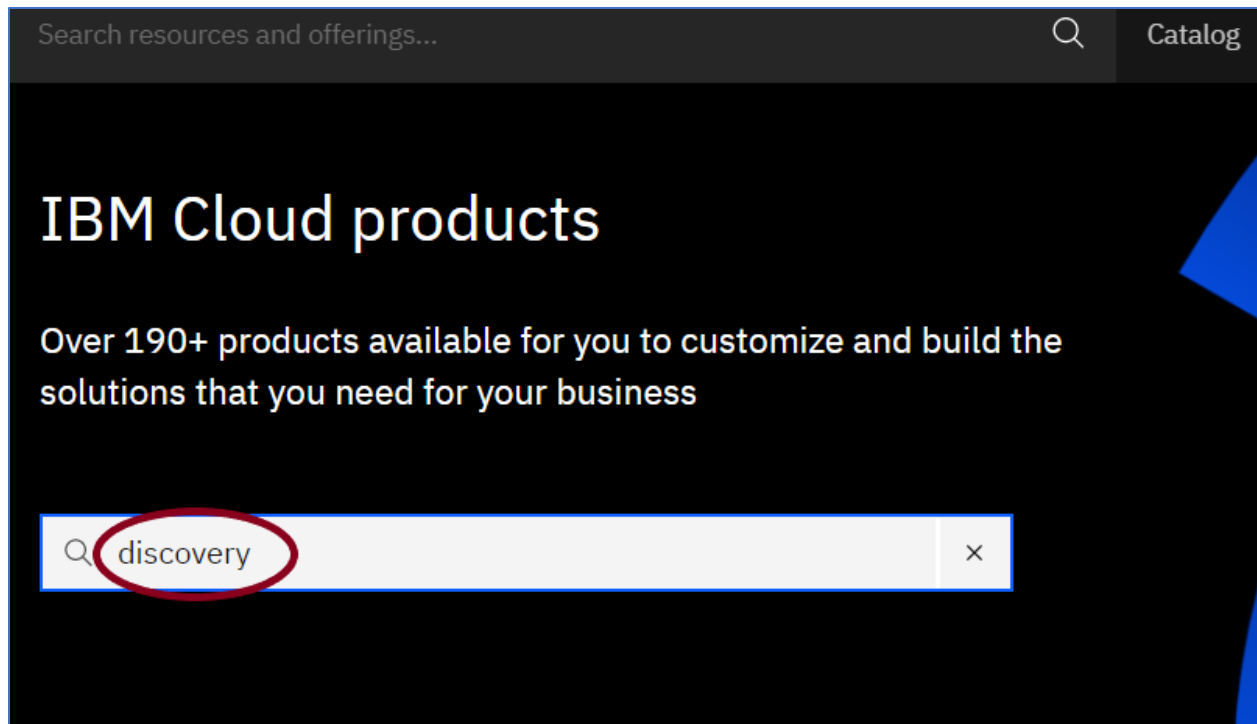
1. This lab is designed to be able to standalone. So, the assumption here is that a Discovery service needs to be created. If one already exists, please skip to step 7. Otherwise, click on the Watson Service browser tab.



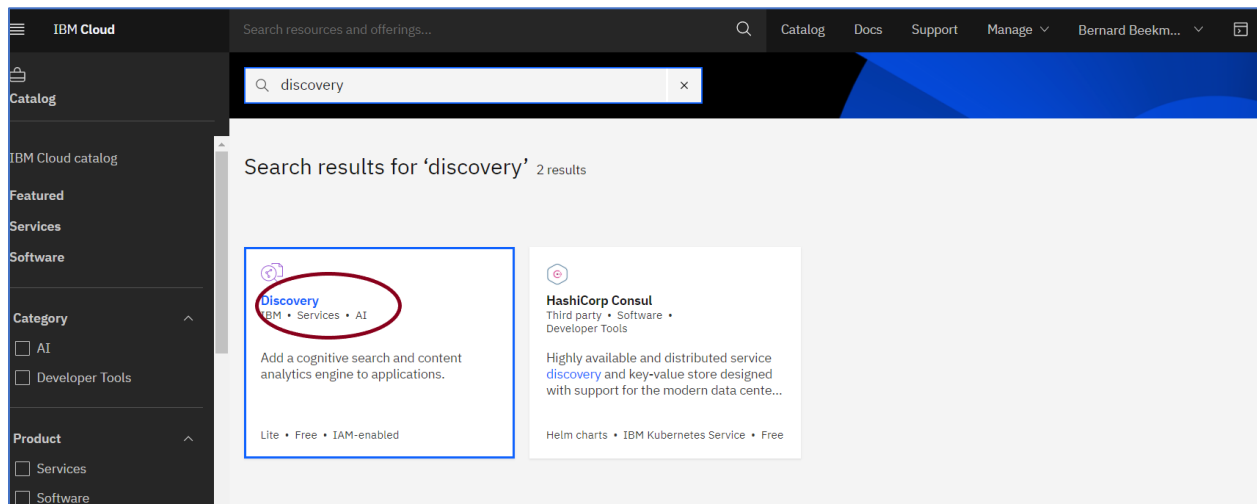
2. Click on **Catalog**.



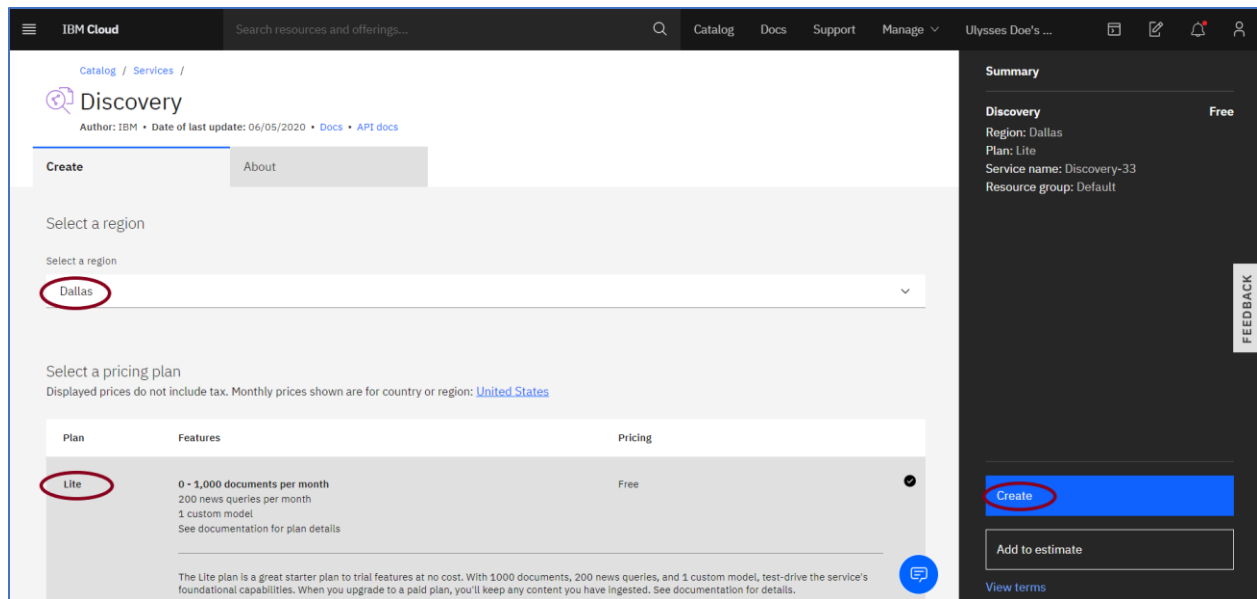
3. Enter discovery in the search box and click the <Enter> key.



4. Click **Discovery**.



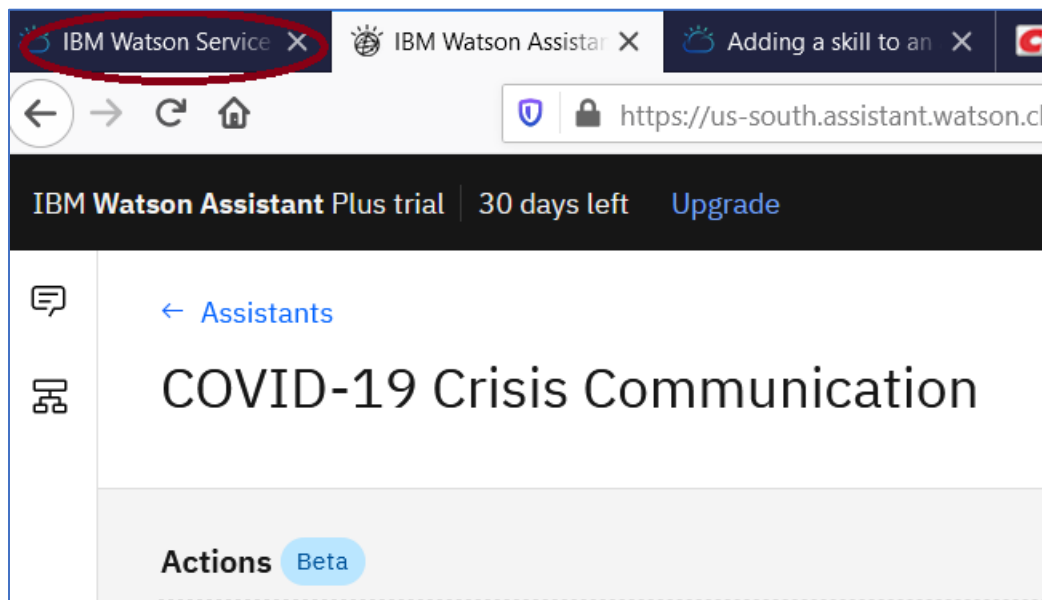
5. Click **Create** to create the Discovery instance. **MAKE SURE TO CHANGE THE DISCOVERY INSTANCE TO BE THE SAME REGION AS THE WATSON ASSISTANT INSTANCE.**



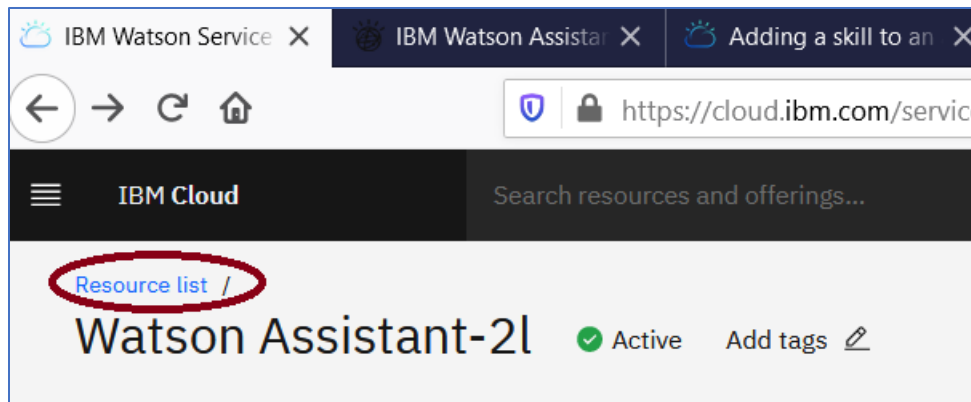
- The service may take some time to create. The **Resource** list page is displayed with the Discovery service showing a status of Provision in progress. Wait until the status is **Active**, and then skip to step 9.



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



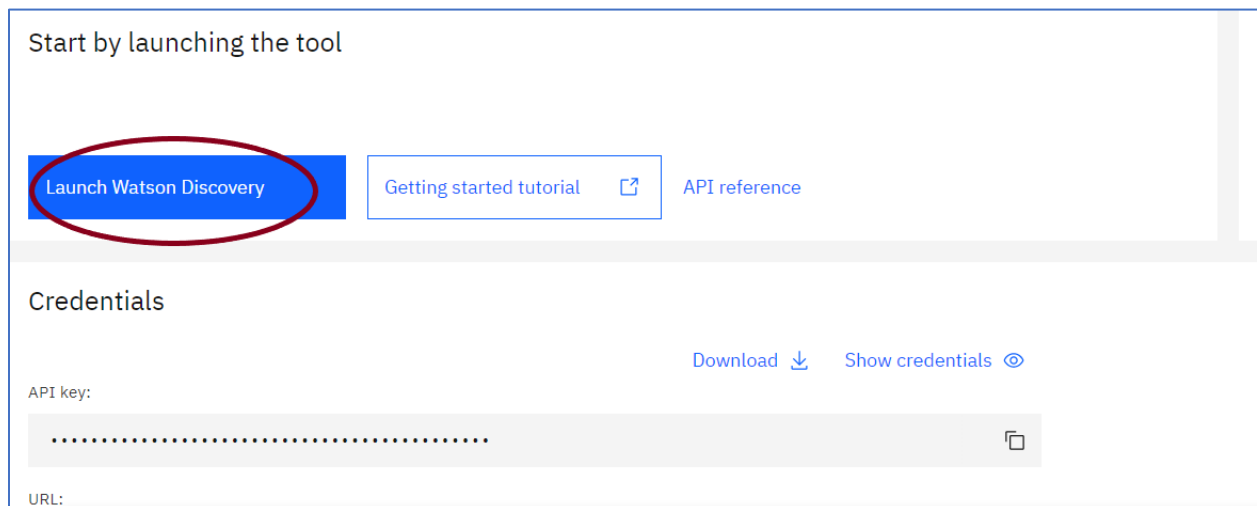
- Click on **Resources list**.



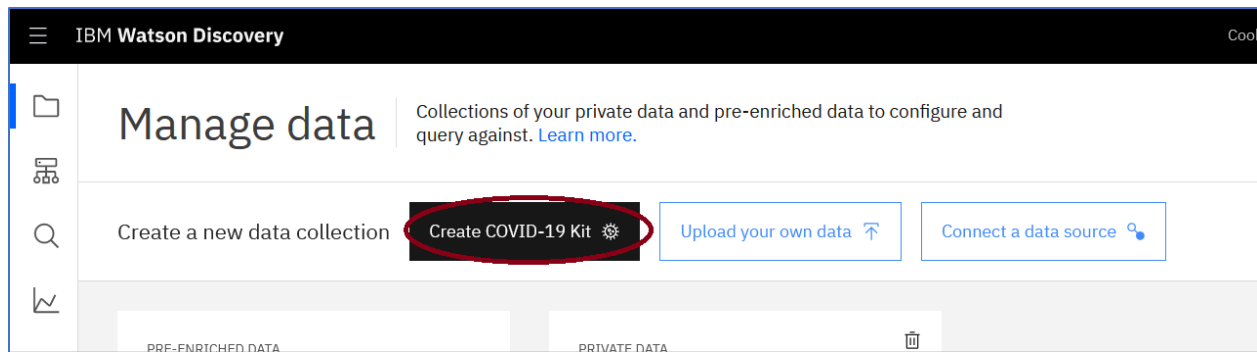
9. Click on the Discovery service.

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

10. Click **Launch Watson Discovery**.



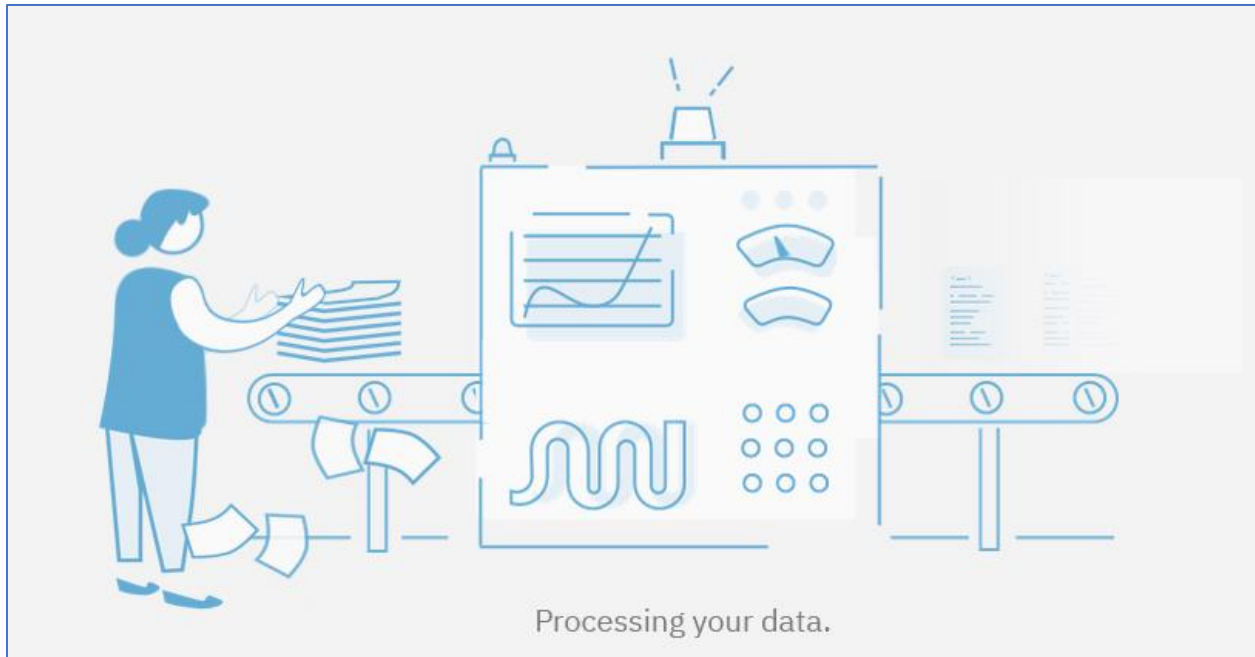
11. Click **Create COVID-19 Kit**. This pre-built collection will jump-start your ability to answer people's COVID-19 questions. This collection uses trusted sources to automatically extract timely information related to COVID-19. You can customize for your users by adding your own URLs to pull answers.



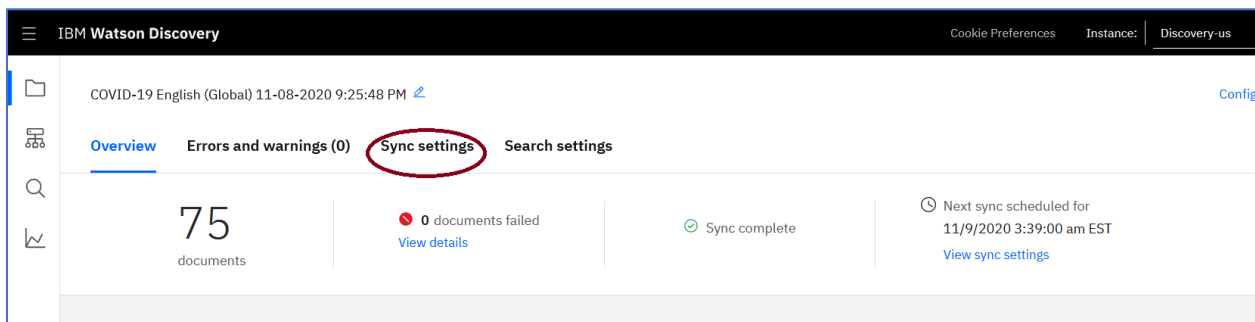
12. Click **Create**.

The screenshot shows a dialog box titled 'Name your new collection' with a close button (X) in the top right corner. The dialog 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)'. The dialog also contains two paragraphs 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.' and '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' (highlighted with a red circle).

13. Wait until the collection processing is completed.



14. Click on **Sync Settings**.



15. 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**

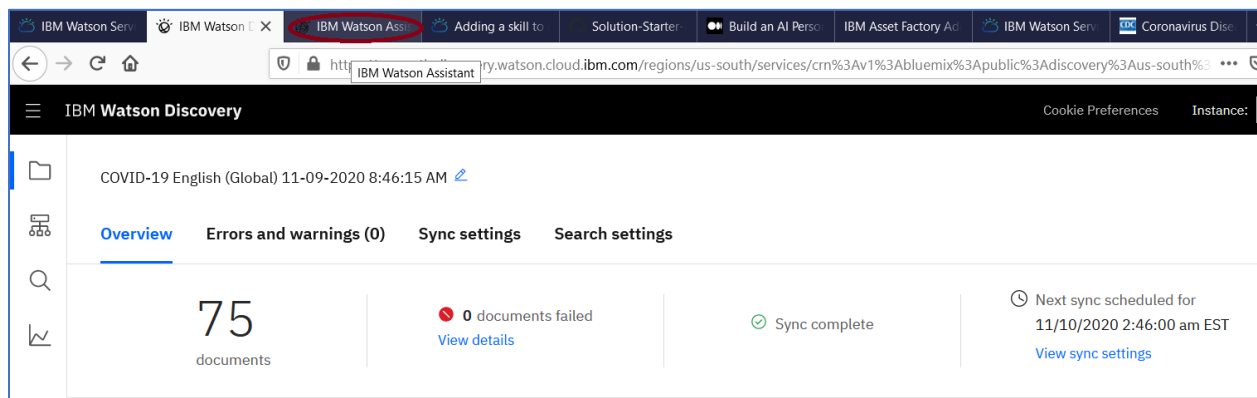
URL to start at (e.g. <http://domain.com> or <http://domain.com/path/sub-path>)

Enter URL Add

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

16. 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.

17. Click on the Watson Assistant browser tab.



IBM Watson Assistant

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

IBM Watson Discovery

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](#)

18. Click on **Add Search Skill**.

← Assistants

## COVID-19 Crisis Communication

### Actions Beta

#### Build conversations easier than ever

- 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
- Focus more on your customer's goals and experience
- Collaborate and work more intuitively, made so that anybody can build

[Learn more](#)

Add an actions skill

### Dialog

#### CDC COVID FAQ

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

### 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

19. 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

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

### Skills / COVID19 Discovery

IBM Watson Discovery instances house collections of data your assistant can leverage to answer end user queries. [Learn more](#)

Choose a Discovery instance to connect to ⓘ

Discovery-us

Choose which collection you want to use ⓘ

Collection name	
<input type="radio"/> COVID19-SVI	<a href="#">✕</a>
<input checked="" type="radio"/> COVID-19 English (Global) 11-09-2020 8:46:15 AM	<a href="#">✕</a>

ⓘ Collection limit reached. [Learn more](#)

Configure

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

← Back Try it

## Skills / COVID19 Discovery

Discovery instance: Discovery-us Collection: COVID-19 English (Global) 11-09-2020 8:46:15 AM

Learn how to troubleshoot and fine tune your search skill. [Learn more](#)

### 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.

Title

title Example: What is COVID-19?

Body

text Example: COVID-19 is the infectious disease ca...

URL

metadata.source.url Example: https://www.who.int/emergencies/dis...

Search skill results will be surfaced to end users as a card.

Title

What is COVID-19?

Body

COVID-19 is the infectious disease caused by the coronavirus, SARS-CoV-2, which is a respiratory pathogen. WHO first learned of this new virus from

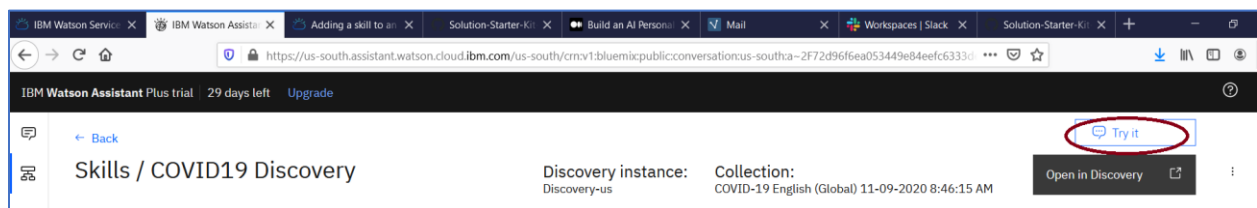
URL

https://www.who.int/emergencies/diseases/novel...

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

22. 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.

23. Click on **Try it** at the top right of the screen to try out the search interface.



24. Enter **What are the tests for COVID-19?** and press the <Enter> key.

Preview how search skill results will be surfaced

What are the tests for COVID-19

Use the up key for most recent

25. The response is shown below.

# Try it out

Clear ×

Preview how search skill results will be surfaced

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

*The FDA recently granted emergency use aut...*

The FDA recently granted emergency use authorization (EUA) for a new diagnostic *test* for *COVID-19*. Results from this inexpensive ▾

<https://www.health.harvard.edu/diseases-...>

*The FDA recently granted emergency use aut...*

The FDA recently granted emergency use authorization (EUA) for a new diagnostic *test* for *COVID-19*. Results from this inexpensive ▾

<https://www.health.harvard.edu/diseases-...>

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

**Message** No results found Connectivity issue

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

**Extract FAQ pairs** Beta

When syncing, FAQs (Frequently asked questions) content will be identified automatically and used to give more precise results.

☒ **Applied**

**Adjust result quantity**

Show the top  results

☒ Include link for customers to view up to 10 results

**Set result selectivity**

Refine results to return more selective answers Beta

☐ Off

Cancel Create

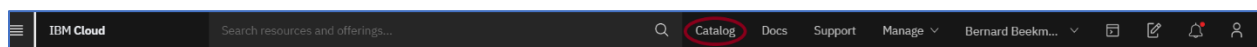
## Exercise 5: Create Cloud Functions

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.



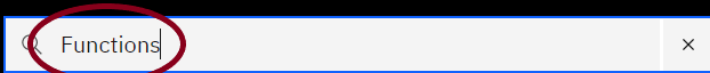
2. Click on **Catalog**.



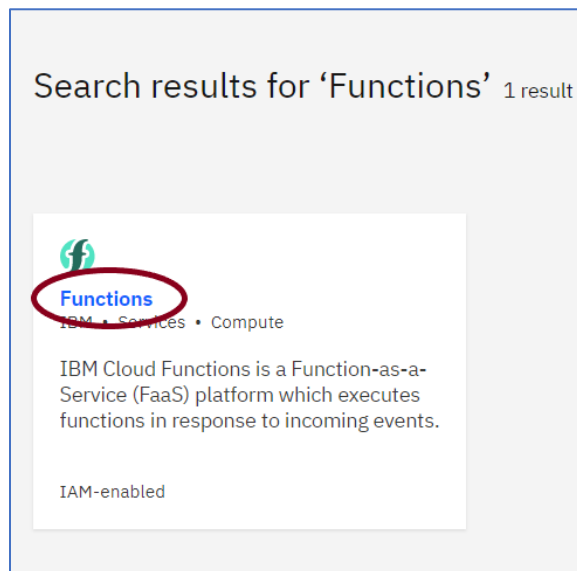
3. Type in **Functions** in the **Search** text box and press the <Enter> key.

# IBM Cloud products

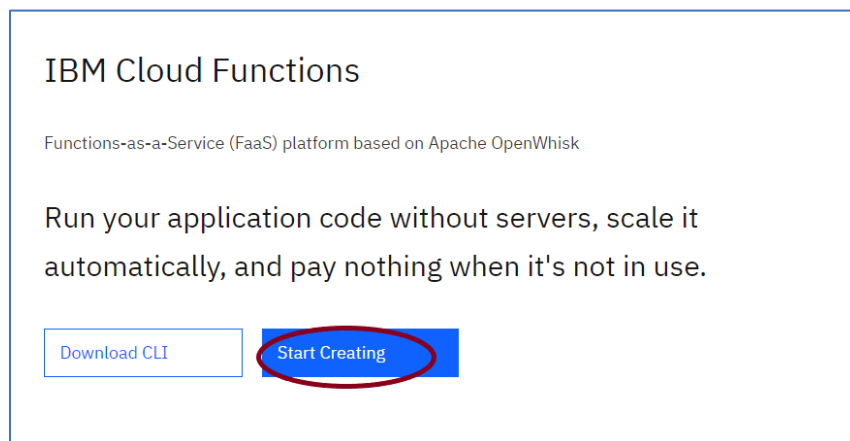
Over 190+ products available for you to customize and build the solutions that you need for your business



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

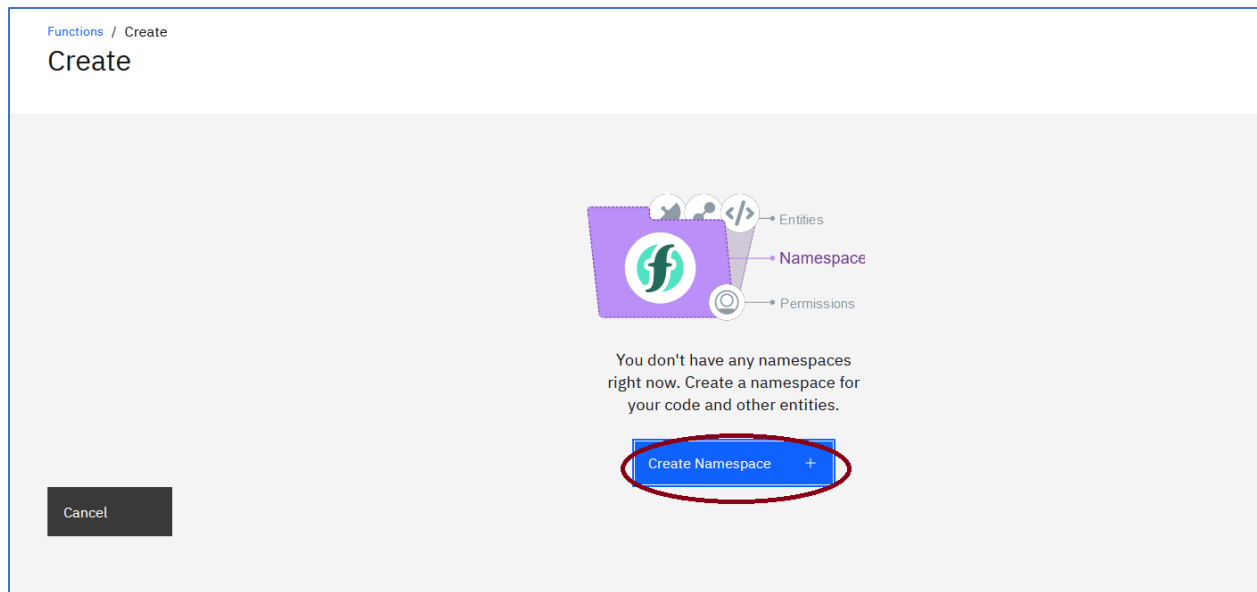


5. Click **Start Creating**.



6. Click **Create Namespace**.





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

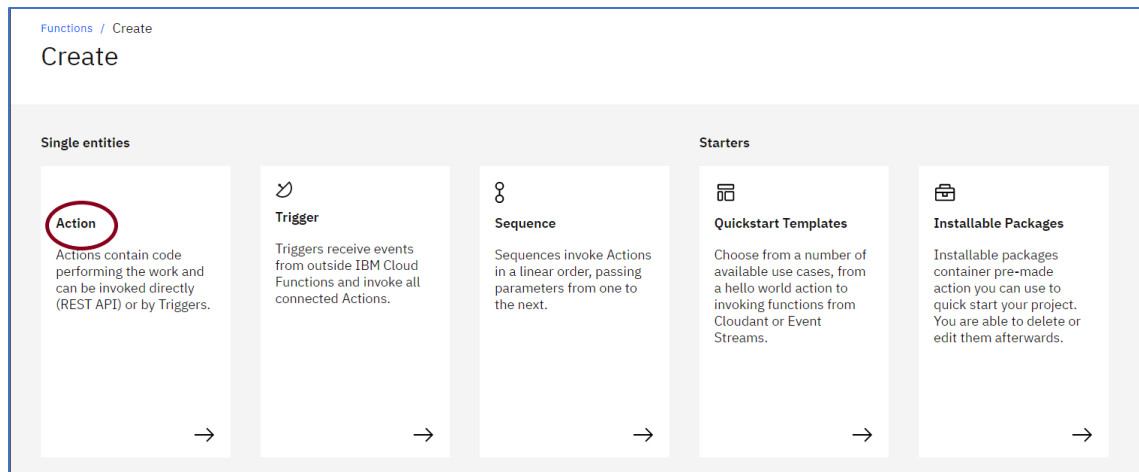
**Description**  
Add a description to your namespace

**Pricing Plan**

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

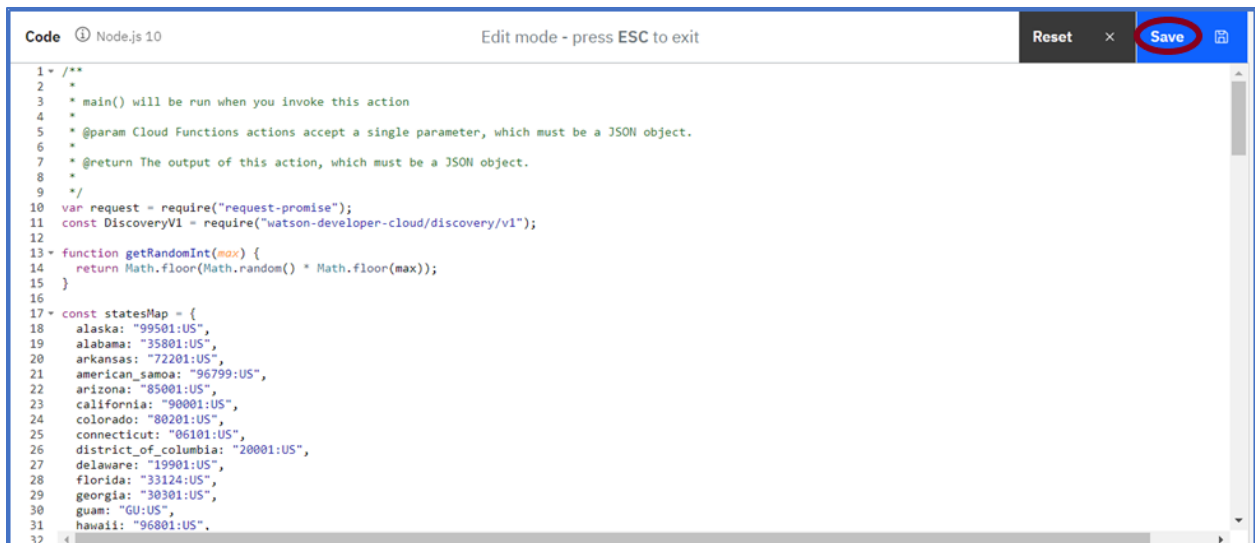
Cancel Create

8. Click **Action**.



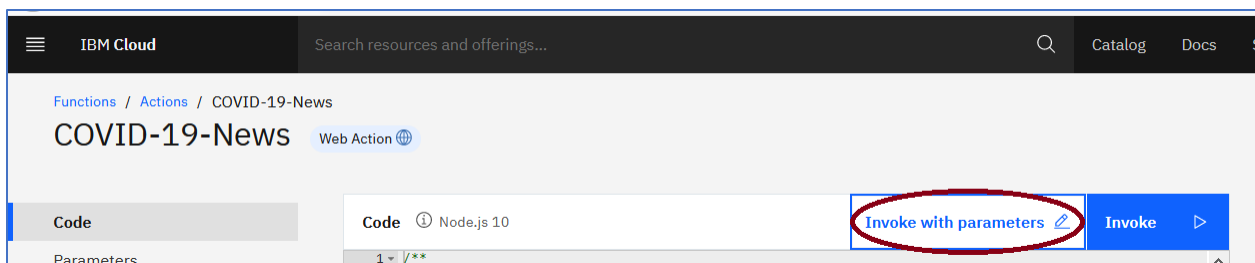
9. Enter **COVID-19-News** for the **Action Name**, select **Node.js 10** for the **Runtime**, and click **Create**.

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



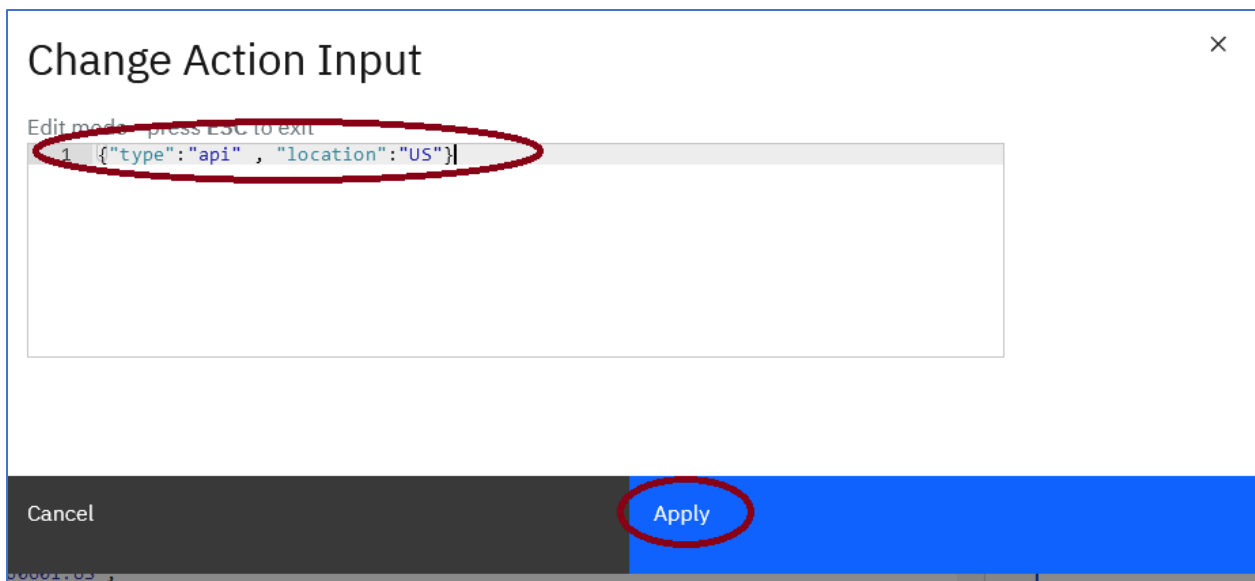
```
1 *  
2 *  
3 * main() will be run when you invoke this action  
4 *  
5 * @param Cloud Functions actions accept a single parameter, which must be a JSON object.  
6 *  
7 * @return The output of this action, which must be a JSON object.  
8 *  
9 */  
10 var request = require("request-promise");  
11 const DiscoveryV1 = require("watson-developer-cloud/discovery/v1");  
12  
13 * function getRandInt(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 * }
```

11. 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**.

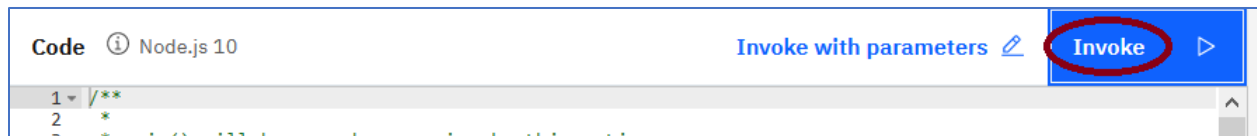


12. Copy and paste the following into the **Action Input** field and then click **Apply**.

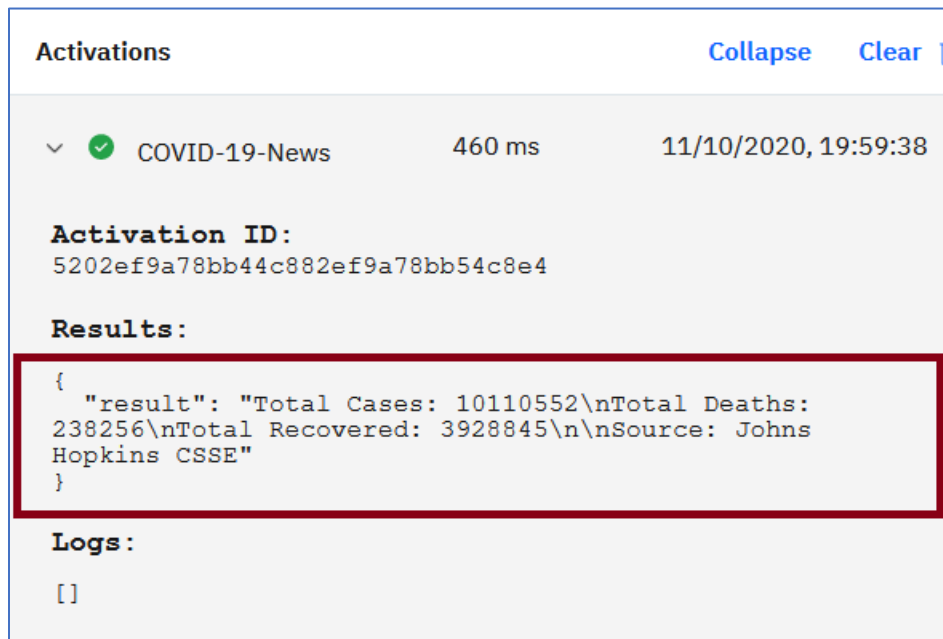
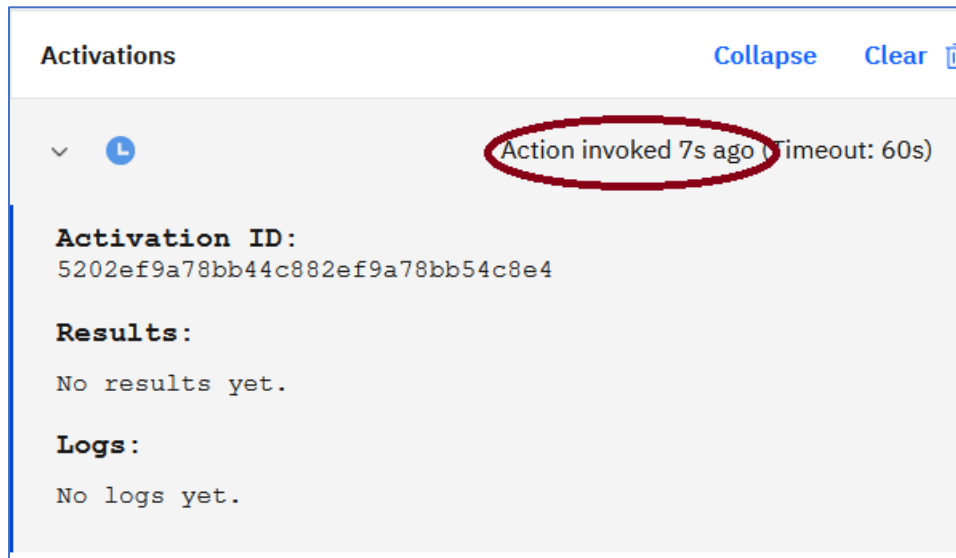
```
{"type": "api" , "location": "US"}
```



13. Click **Invoke**



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



15. 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 highlighted in the left sidebar. The main pane displays the Node.js code for the function, which includes a comment about the main function and a function that generates random data for US states. The 'Activations' tab on the right shows a successful activation with results for COVID-19 statistics, including total cases, deaths, and recoveries.

16. Click on **Enable as a Web Action**. Copy and paste the http url to a Notepad file. Label it as Web Action url and 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 highlighted in the left sidebar. The main pane shows the 'Web Action' section with the 'Enable as Web Action' checkbox checked. Below this, there is a table with HTTP methods and their corresponding URLs. A Notepad window is open, showing the copied URL with '.json?blocking=true' added to the end.

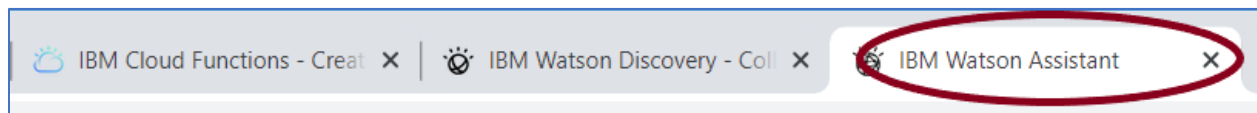
## Exercise 6: Integrate data sources via a Watson Assistant webhook.

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.

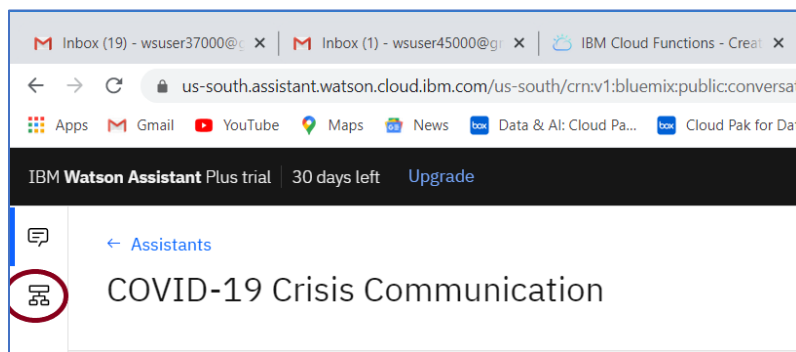
You can use a webhook to do the following types of things:

- 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. At the top, there's a 'Create skill' button. Below it, two skill cards are displayed. The first card, 'CDC COVID FAQ', has its title circled in red. It is a 'Dialog' type for 'English (US)', 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', is also a 'Dialog' type for 'English (US)', created and updated on Jun 7, 2020 at 12:13 PM EDT, and is linked to the 'My first assistant'.

4. Click on **Options**.

This screenshot shows the configuration page for the 'CDC COVID FAQ' skill. The left sidebar contains a menu with options: Intents, Entities, Dialog, Options, Analytics, Versions, and Content Catalog. The 'Options' option is circled in red, indicating it is the selected tab.

5. Cut and paste the Web Action url from the Notepad file into the **URL** field.

CDC COVID FAQ Version: Development Save new version

Intents  
Entities  
Dialog  
Options  
**Webhooks**  
Disambiguation  
Autolearning  
Autocorrection  
Irrelevance Detection  
Analytics  
Versions  
Content Catalog

## Webhooks

A webhook is a mechanism that allows you to call out to an external program based on events in your dialog.

### Webhook setup

Specify the request URL for an external API you want to be able to invoke from dialog nodes. Watson will call this URL when configured to do so from a dialog node. [Learn more](#)

URL

`https://us-south.functions.appdomain.cloud/api/v1/web/wsuser!`

### Headers

Add HTTP headers for authorization or any other parameters required for invoking the webhook.

Ln 1, Col 48 100% Windows (CRLF) UTF-8

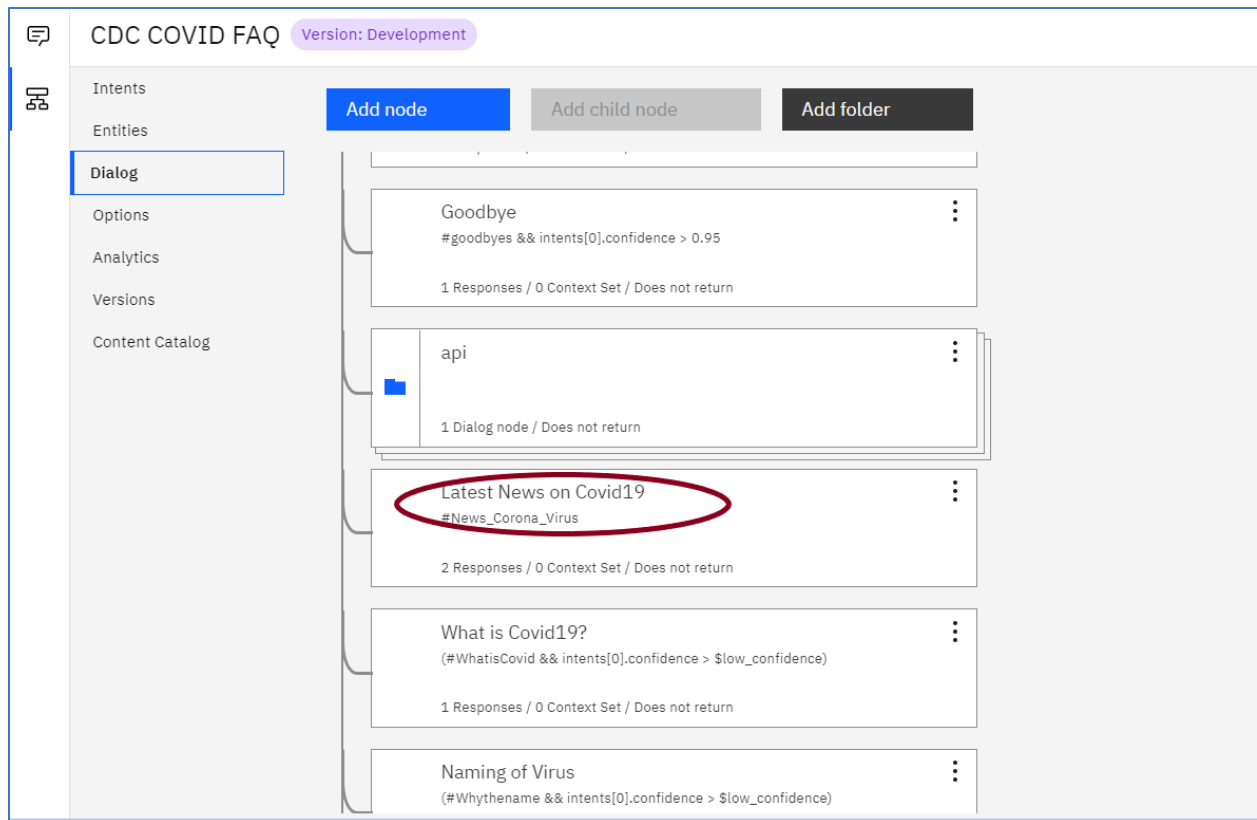
6. Click on **Dialog**.

CDC COVID FAQ Version: Development

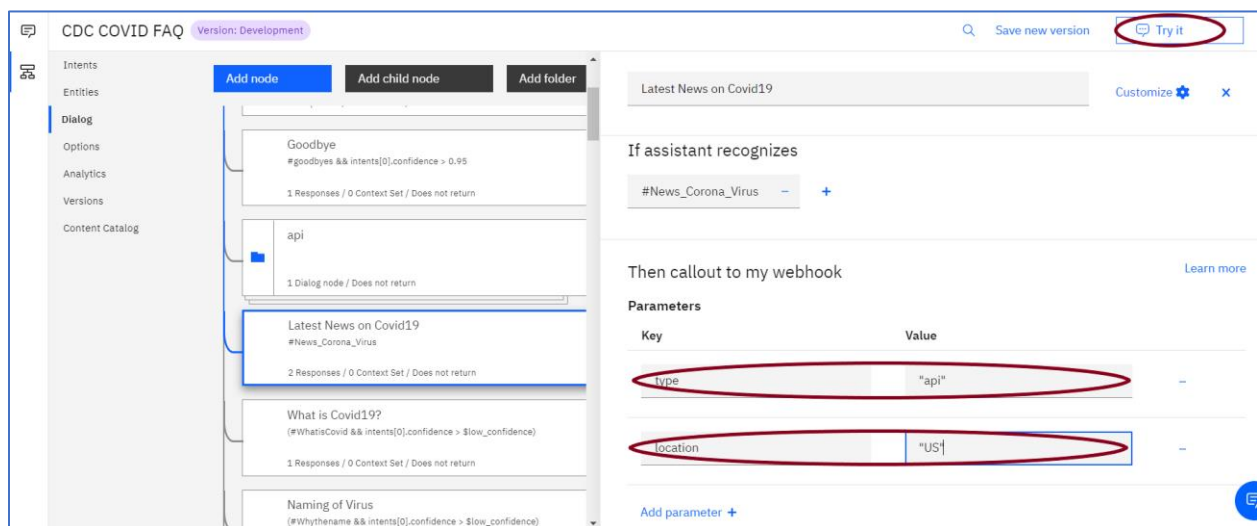
Intents  
Entities  
**Dialog**  
Options  
Analytics  
Versions  
Content Catalog

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

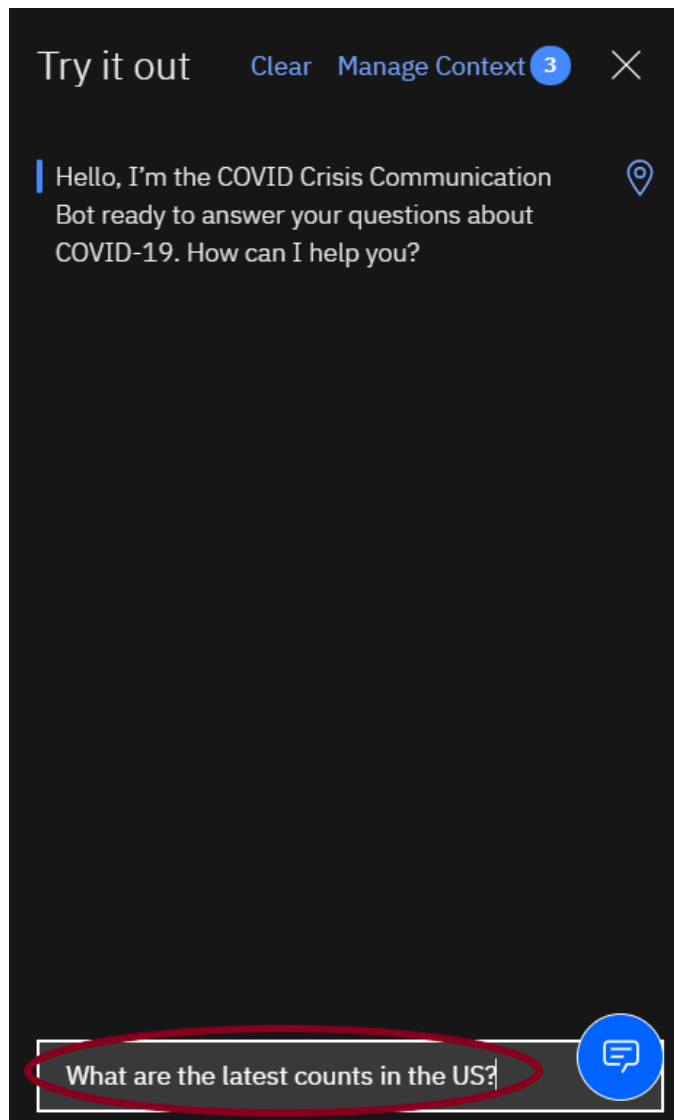




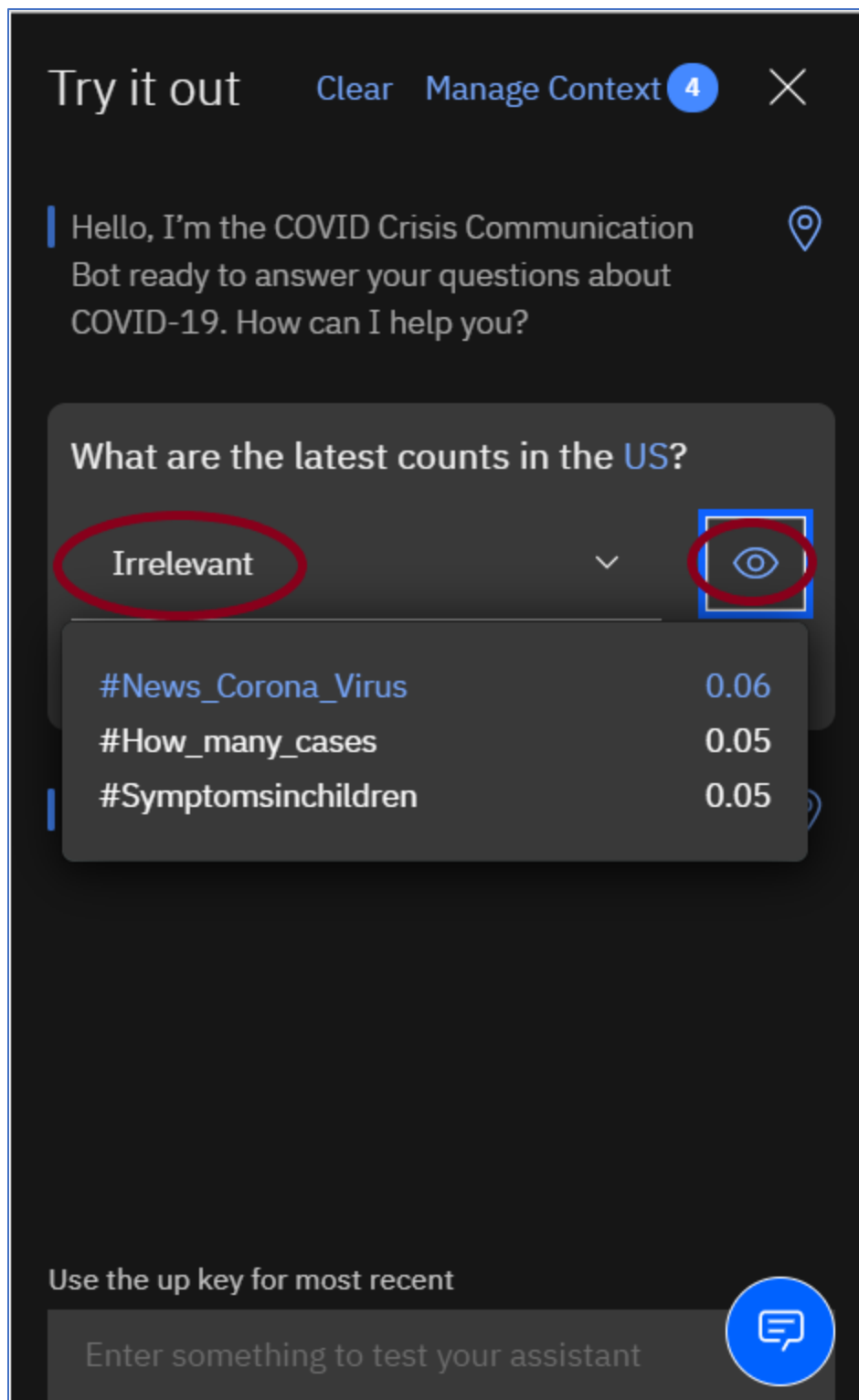
8. Add parameters **type** with value “api”, and **location** with value “US”, then click **Try It**.



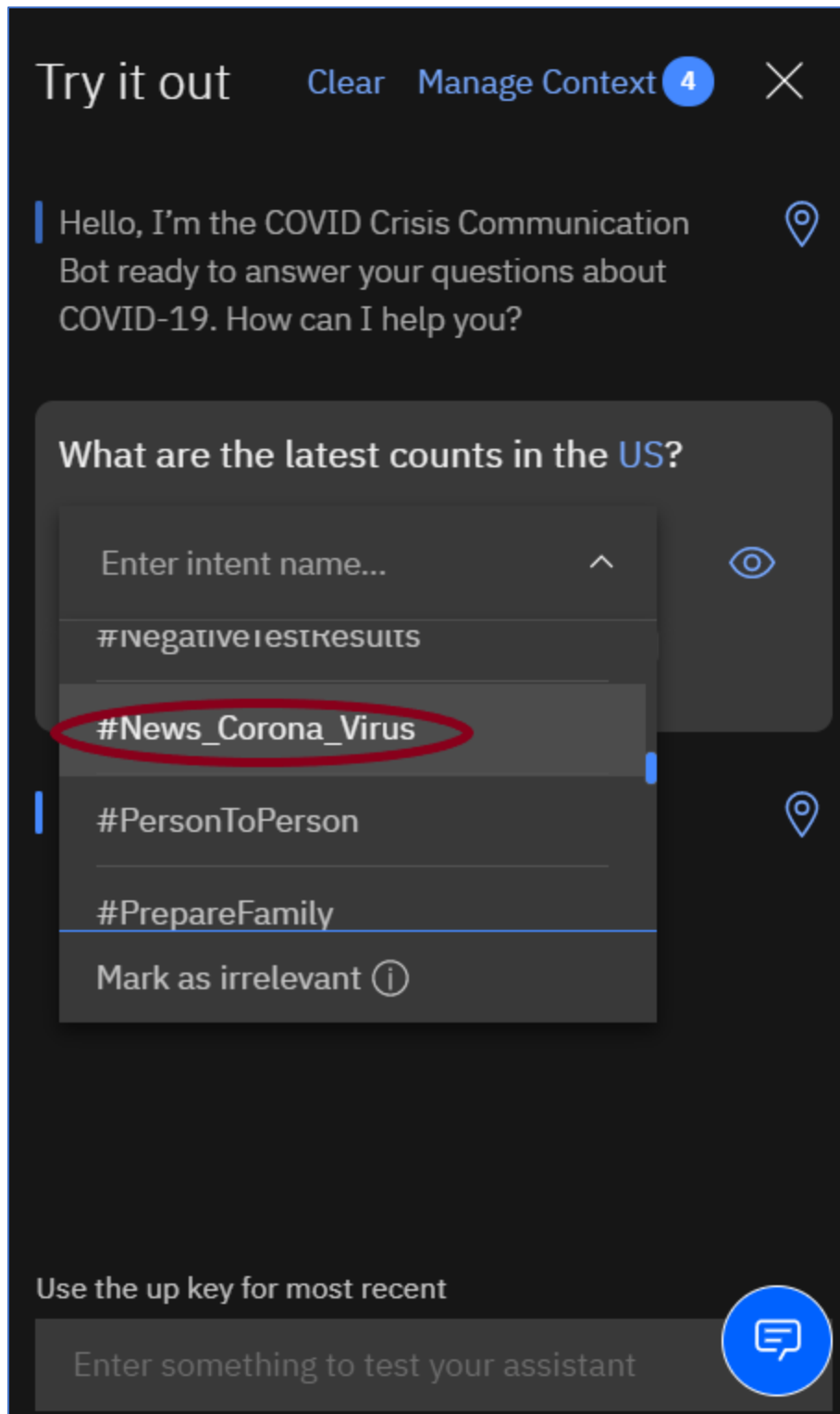
9. Enter “What are the latest counts in the US” and then press <Enter>



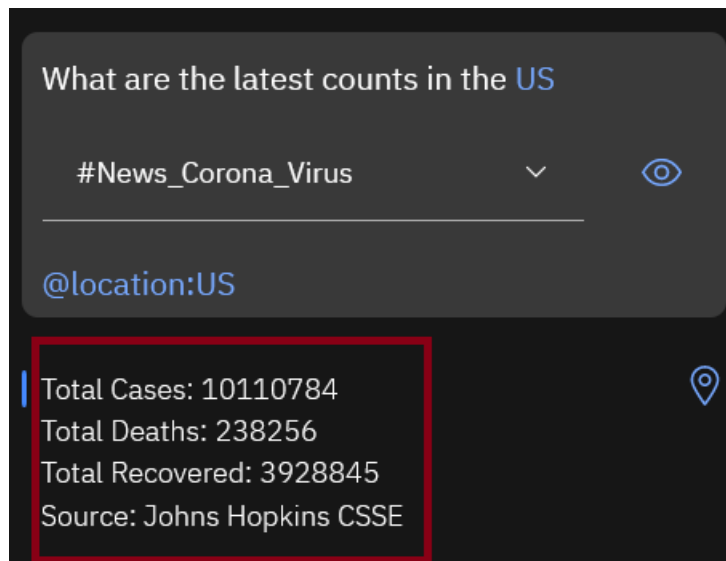
10. The system responds with Irrelevant, meaning that it couldn't find an Intent. By hovering over the eye icon, you can see that #News\_Corona\_Virus intent had the highest confidence, but was below the cutoff threshold for relevance.



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.



This implementation has hardcoded an intent to provide the latest COVID-19 counts for the US. In order to generalize this to other locations, we would create an entity (e.g. @location) and provide a set of values and synonyms. Watson Assistant has the concept of slots to also prompt the user if a location is not provided. We would then assign the @location value to a context variable that would be used as the parameter to query the API.

**You have completed the Lab!**

