

A Project Report On

**"INTELLIGENT CUSTOMER HELP DESK  
WITH  
SMART DOCUMENT UNDERSTANDING -  
SB28785"**

Completed At  
**The SmartBridge**  
([smartinternz.com](http://smartinternz.com)@2020)



Submitted By  
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(Category - MACHINE LEARNING)

## **ACKNOWLEDGEMENT**

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**Team Name:**

**Shivam Kadwade**

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# 1.INTRODUCTION

## 1.1 Overview:

We will be able to write an application that leverages multiple Watson AI Services (Discovery , Assistant, Cloud function and Node Red). By the end of the project, we'll learn best practices of combining Watson services, and how they can build interactive information retrieval systems with Discovery + Assistant.

- Project Requirements: Python, IBM Cloud, IBMWatson,Node- RED
- Functional Requirements: IBM cloud
- Technical Requirements: AI,ML,WATSON AI,PYTHON
- Software Requirements: Watson assistant, Watson discovery.
- Project Deliverables: Smartinternz Internship
- Project Team: Shivam Vishwanath Kadwade
- Project Duration:19 days

## 1.2 Purpose:

The typical customer care chatbot can answer simple questions, such as store locations and hours, directions, and maybe even makin appointments. When a question falls outside of the scope of the pre-determined question set, the option is typically to tell the customer the question isn't valid or offer to speak to a real person. In this project, there will be another option. If the customer question is about the operation of a device, the application shall pass the question onto Watson Discovery Service, which has been pre-loaded with the device's owner's manual. So now, instead of "Would you

like to speak to a customer representative?” we can return relevant sections of the owner’s manual to help solve our customers’ problems. To take it a step further, the project shall use the Smart Document Understanding feature of Watson Discovery to train it on what text in the owner’s manual is important and what is not. This will improve the answers returned from the queries

### **1.2.1 Scope of Work:**

- Create a customer care dialog skill in Watson Assistant
- Use Smart Document Understanding to build an enhanced Watson Discovery collection
- Create an IBM Cloud Functions web action that allows Watson Assistant to post queries to Watson Discovery
- Build a web application with integration to all these services & deploy the same on IBM Cloud Platform

## **2.LITERATURE SURVEY**

### **2.1 Existing problem:**

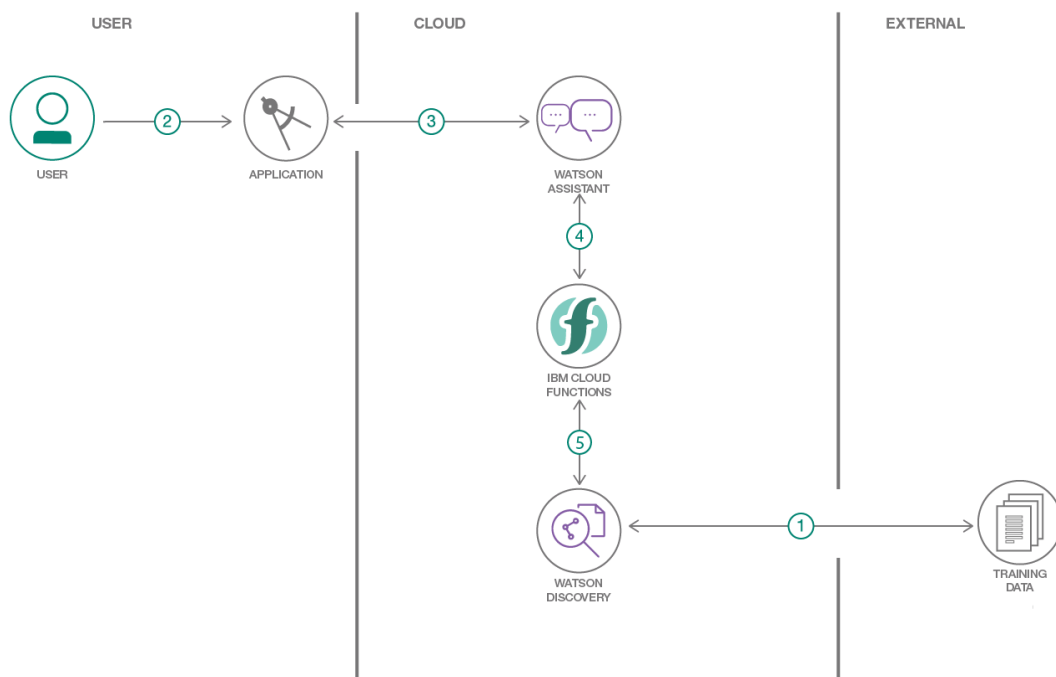
Generally Chatbots means getting input from users and getting only response questions and for some questions the output from bot will be like “try again”, “I don’t understand”, “will you repeat again”, and so on... and directs customer to customer agent but a good customer Chatbot should minimize involvement of customer agent to chat with customer to clarify his/her doubts. So to achieve this we should include an virtual agent in chatbot so that it will take care of real involvement of customer agent and customer can clarifies his doubts with fast chatbots.

## 2.2 Proposed solution:

For the above problem to get solved we have to put an virtual agent in chatbot so it can understand the queries that are posted by customers. The virtual agent should be trained from some insight records based on company background so it can answer queries based on the product or related to company. In this project I used Watson Discovery to achieve the above solution. And later including Assistant and Discovery on Node-RED.

## 3. THEORETICAL ANALYSIS

### 3.1 Block/Flow Diagram:



1. The document is annotated using Watson Discovery SDU
2. The user interacts with the backend server via the app UI. The

frontend app UI is a chatbot that engages the user in a conversation.

3. Dialog between the user and backend server is coordinated using a Watson Assistant dialog skill.
4. If the user asks a product operation question, a search query is passed to a predefined IBM Cloud Functions action.
5. The Cloud Functions action will query the Watson Discovery service and return the results.
- 6.

### **3.2 Hardware / Software designing:**

1. Create IBM Cloud services
2. Configure Watson Discovery
3. Create IBM Cloud Functions action
4. Configure Watson Assistant
5. Create flow and configure node
6. 6. Deploy and run Node Red app
- 7.

## **4.EXPERIMENTAL INVESTIGATIONS**

### **1.Create IBM Cloud services**

Create the following services:

- Watson Discovery
- Watson Assistant
- Node Red
- IBM cloud function

Creation of Node-RED in IBM cloud:

Step-1: Login to IBM and go to the catalog

Step-2: Search for node-red and select “Node-RED Starter “ Service Step-3:

Enter the Unique name and click on create a button Note: Your Node-red service is starting

Step – 5: We have to configure Node red for the first time. Click on  next to continue

Step – 6: Secure your node red editor by giving a username and password and click on Next

Step – 7: Click Next to continue

Step – 8: Click Finish

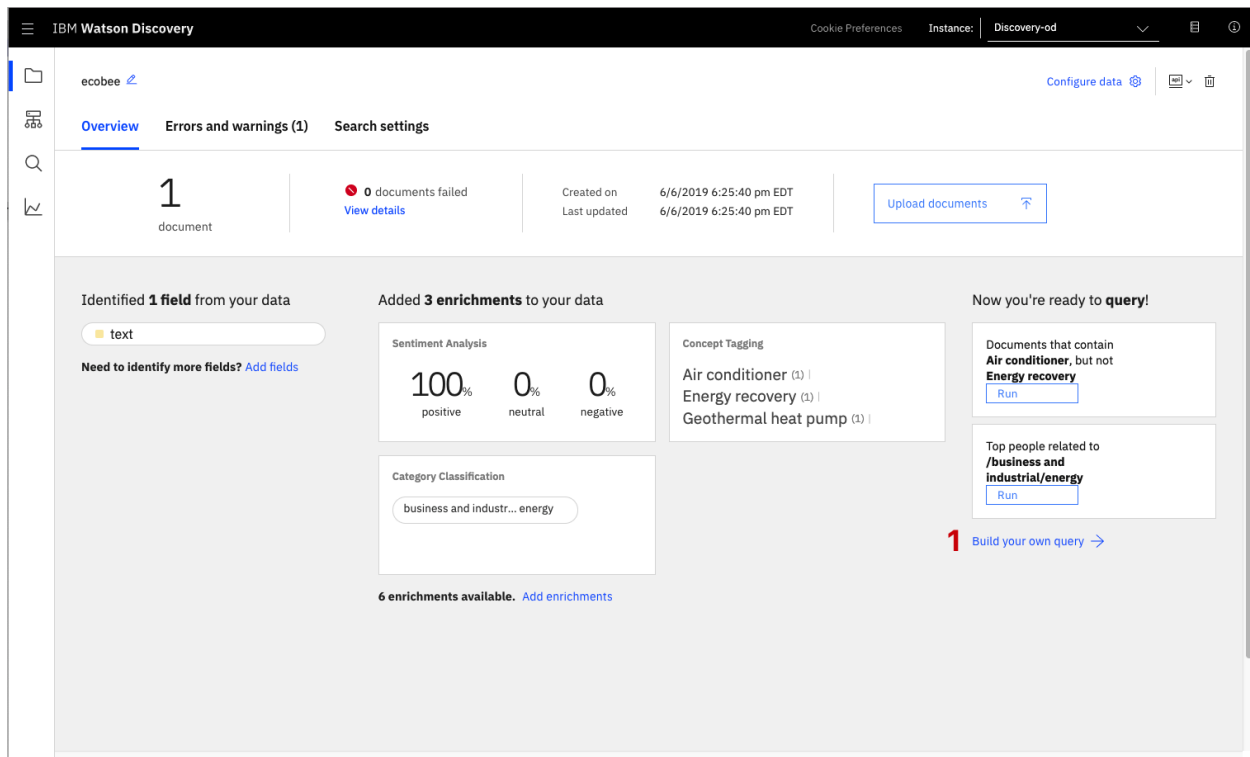
Step – 9: Click on Go to Node-Red flow editor to launch the flow editor  
Node red editor has various nodes with the respective functionality

## **Creation of Watson discovery instance in IBM Cloud:**

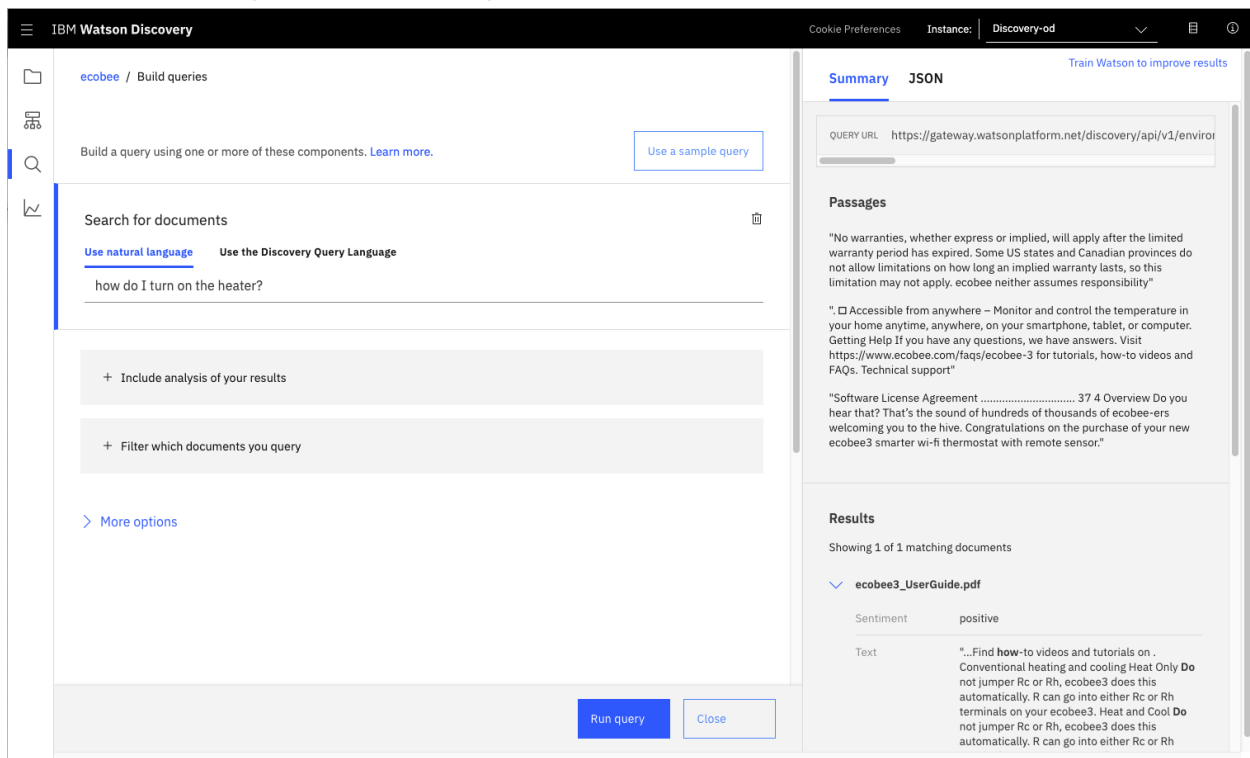
### **1.Import the document**

As shown below, launch the Watson Discovery tool and create a new data collection by selecting the Upload your own data option. Give the data collection a unique name. When prompted, select and upload the ecobee3\_UserGuide.pdf. The Ecobee is a popular residential thermostat that has a wifi interface and multiple configuration options. Before applying SDU to our document, lets do some simple queries on the data so that we can compare it to results found after applying SDU.





Click the Build your own query [1] button.



Enter queries related to the operation of the thermostat and view the results. As you will see, the results are not very useful, and in some cases,

[2] is the current page being annotated.

[3] is where you select text and assign it a label.

[4] is the list of labels you can assign to the page text.

Click [5] to submit the page to Discovery.

Click [6] when you have completed the annotation process.

As you go through the annotations one page at a time, Discovery is learning and should start automatically updating the upcoming pages. Once you get to a page that is already correctly annotated, you can stop, or simply click Submit [5] to acknowledge it is correct. The more pages you annotate, the better the model will be trained.

For this specific owner's manual, at a minimum, it is suggested to mark the following:

The main title page as title

The table of contents (shown in the first few pages) as table\_of\_contents

All headers and sub-headers (typed in light green text) as a subtitle

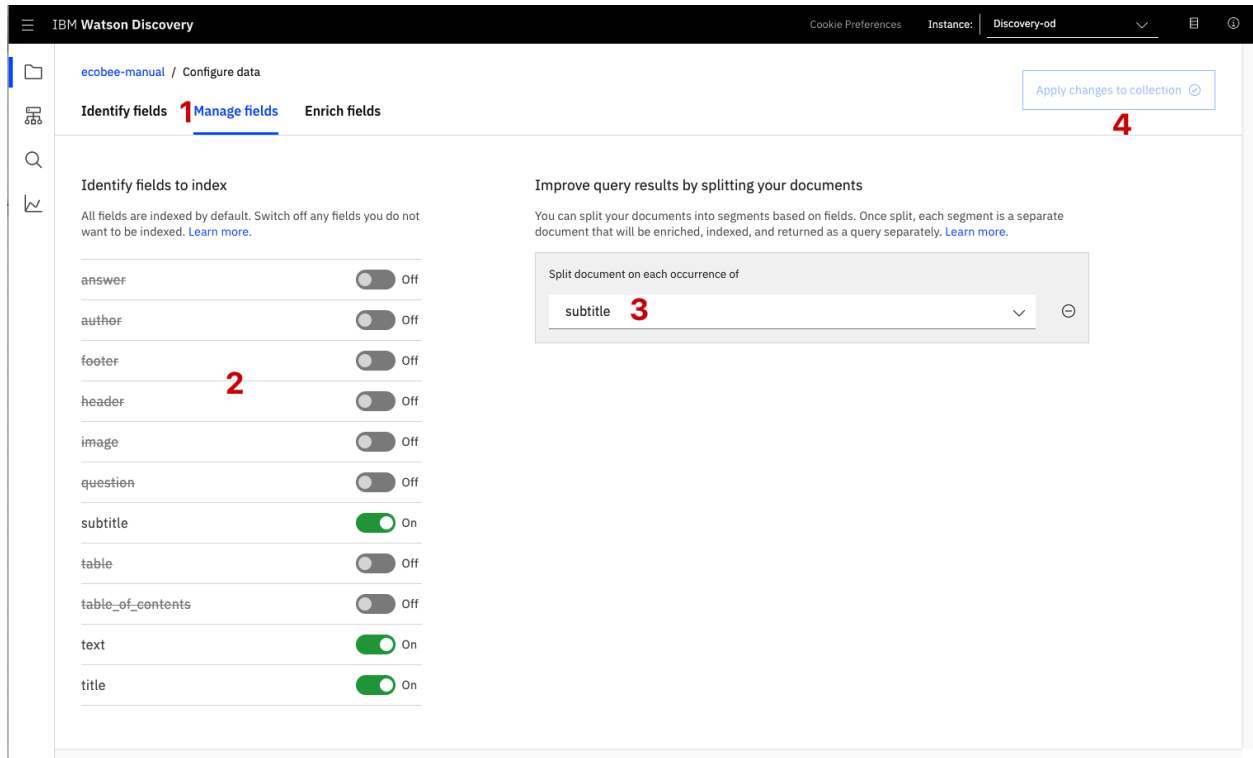
All page numbers as footers

All warranty and licensing information (located in the last few pages) as a footer.

All other text should be marked as text.

Once you click the Apply changes to collection button [6], you will be asked to reload the document. Choose the same owner's manual .pdf document as before.

Next, click on the Manage fields [1] tab.



[2] Here is where you tell Discovery which fields to ignore. Using the on/off buttons, turn off all labels except subtitles and text.

[3] is telling Discovery to split the document apart, based on subtitle. Click [4] to submit your changes.

Once again, you will be asked to reload the document.

Now, as a result of splitting the document apart, your collection will look very different:

The screenshot shows the IBM Watson Discovery Overview page for a dataset named 'ecobee-manual'. The page displays 130 documents, 0 failed documents, and search settings. It highlights identified fields (footer, subtitle, table\_of\_contents, text, title) and added enrichments (Entity Extraction, Sentiment Analysis, Concept Tagging, Category Classification). The Sentiment Analysis section shows 37% positive, 26% neutral, and 36% negative sentiment. The page also includes a 'Build your own query' button.

IBM Watson Discovery

Cookie Preferences Instance: Discovery-od

ecobee-manual

Configure data

Overview Errors and warnings (130) Search settings

130 documents

0 documents failed View details

Created on 3/28/2019 4:27:53 pm EDT

Last updated 3/28/2019 4:27:53 pm EDT

Upload documents

Identified 5 fields from your data

- footer
- subtitle
- table\_of\_contents
- text
- title

Need to identify more fields? Add fields

Added 4 enrichments to your data

Entity Extraction

0.3°C (4) | 0.5°F (4) | 10 °F (4) | 900 seconds (4) | 20 min (3)

Sentiment Analysis

37% positive 26% neutral 36% negative

Concept Tagging

Heat (17) | Internet (14) | HVAC (13) | Netscape (13) | Temperature (13)

5 enrichments available. Add enrichments

Now you're ready to query!

Entities of type Quantity which have negative sentiment

Run

Documents that contain Heat, but not Internet

Run

Top entities with their average, min, max sentiment score

Run

Build your own query →

Return to the query panel (click Build your own query) and see how much better the results are.

The screenshot shows the IBM Watson Discovery Query panel. The query is 'how do I turn on the heater?'. The panel displays search results, including a summary of the query, passages from the documents, and a list of results. The results section shows 10 of 38 matching documents, with the first result being 'ecobee3\_UserGuide.pdf'.

IBM Watson Discovery

Cookie Preferences Instance: Discovery-od

ecobee-manual / Build queries

Build a query using one or more of these components. Learn more. Use a sample query

Search for documents

Use natural language Use the Discovery Query Language

how do I turn on the heater?

+ Include analysis of your results

+ Filter which documents you query

> More options

Run query Close

Summary JSON

Train Watson to improve results

QUERY URL https://gateway.watsonplatform.net/discovery/api/v1/enviro

Passages

"If you have a furnace or boiler installed: 1. Select the heating menu. 2. Configure the heater type: ☐ Furnace: Optimizes ecobee3 for systems using forced air ☐ Boiler: Optimizes your ecobee3 for systems using radiators or in-floor heat. 3."

"The amount of indoor air required to maintain sufficient indoor air quality depends on how big your house is, how many people live there, and the capacity of your ventilation device. You should consult with a local contractor who can guide you on how often you should be running your ventilation device."

"This menu lets you test the wiring and connections of the devices connected to the thermostat by turning them on or off. The equipment will turn off when you exit the menu. Warning: Compressor protection and minimum run-time features are not enforced while in this mode."

"The following pages provide wiring diagrams for common HVAC equipment configurations. Need help with your ecobee3 wiring? Find how-to videos and tutorials on."

"You can also configure the screen to automatically sleep (i.e. turn off) whenever your ecobee3 enters the Sleep activity period. For example, if your thermostat is located in a bedroom, you may want to blank the screen when you are sleeping, whereas if the thermostat is in a hallway, you may want the screen displayed all the time."

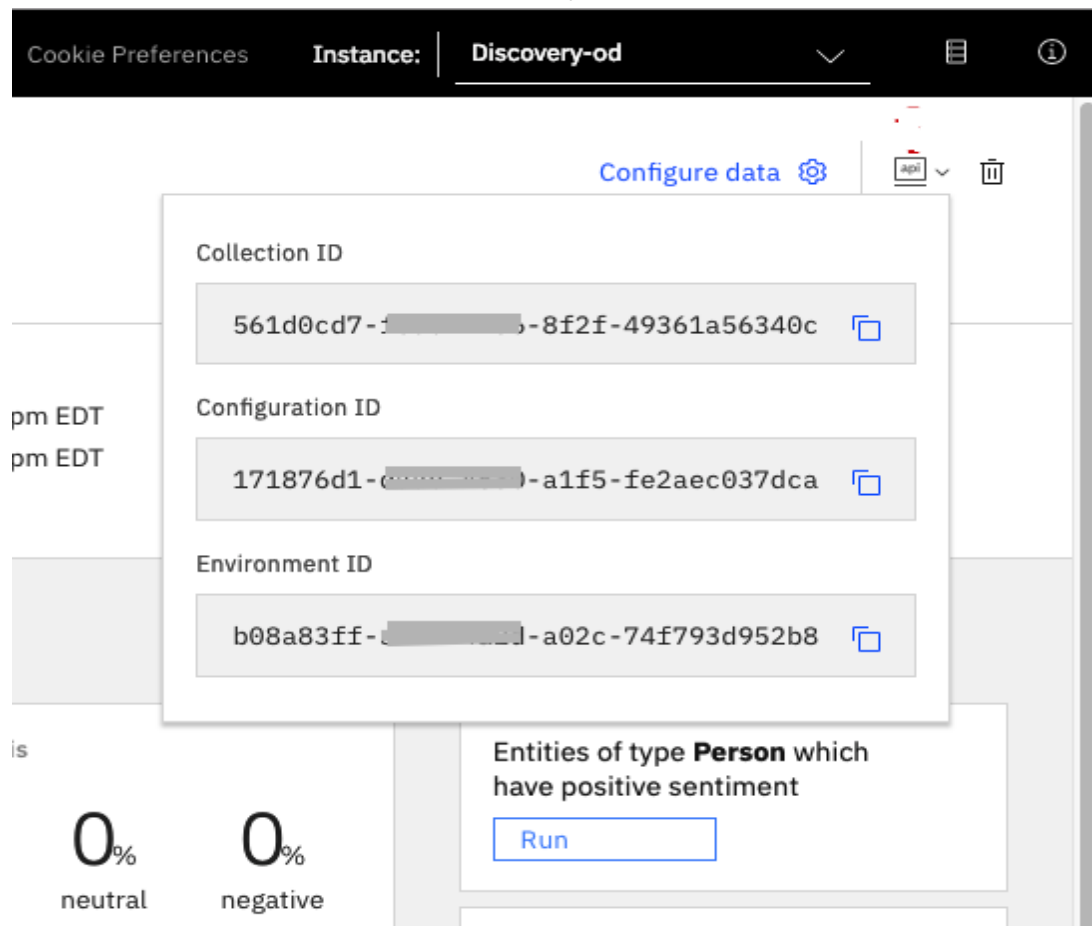
Results

Showing 10 of 38 matching documents

ecobee3\_UserGuide.pdf

Store credentials for future use

In upcoming steps, you will need to provide the credentials to access your Discovery collection. The values can be found in the following locations. The Collection ID and Environment ID values can be found by clicking the dropdown button [1] located at the top right side of your collection panel:



For credentials, return to the main panel of your Discovery service, and click the Service credentials [1] tab:

IBM Cloud

Search resources and offerings...

Resource list /

Discovery-od

Resource group: default Location: Dallas [Add Tags](#)

Service credentials

Credentials are provided in JSON format. The JSON snippet lists credentials, such as the API key and secret, as well as connection information for the service. [Learn more](#)

Service credentials

New credential +

Items per page 10 | 1-1 of 1 items 1 of 1 pages < 1 >

KEY NAME	DATE CREATED	ACTIONS
<input type="checkbox"/> Service credentials-1	FEB 5, 2019 - 09:26:31 AM	<a href="#">View credentials</a> 2

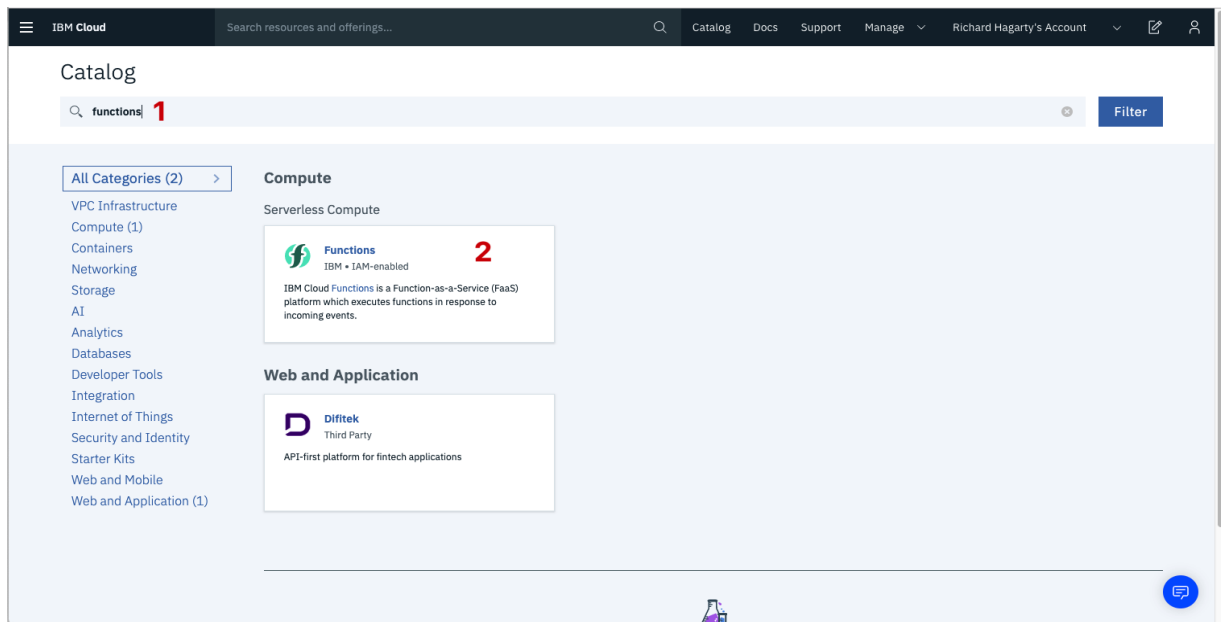
```
3 {
  "apikey": "dry8f3aITnsy",
  "iam_apikey_description": "Auto generated apikey during resource-key operation for Instance - crn:v1:bluemix:public:discovery:us-south:a/bc1bd51c396536dc7d5f81d5a4e19533:atfe2871-3bbd-4e04-a0f9-0daa59770852:",
  "iam_apikey_name": "auto-generated-apikey-f5f36cdd-d1d2-4a17-b41d-8ca5d1fc7a6",
  "iam_role_crn": "crn:v1:bluemix:public:iam:::serviceRole:Manager",
  "iam_serviceid_crn": "crn:v1:bluemix:public:iam-identity::a/bc1bd51c396536dc7d5f81d5a4e19533::serviceid:ServiceId-616b8efa-a050-4708-a191-0b71f43cbddb",
  4 "url": "https://gateway.watsonplatform.net/discovery/api"
```

Click the View credentials [2] drop-down menu to view the IAM apikey [3] and URL endpoint [4] for your service.

### 3.Create IBM Cloud Functions action

Now let's create the web action that will make queries against our Discovery collection.

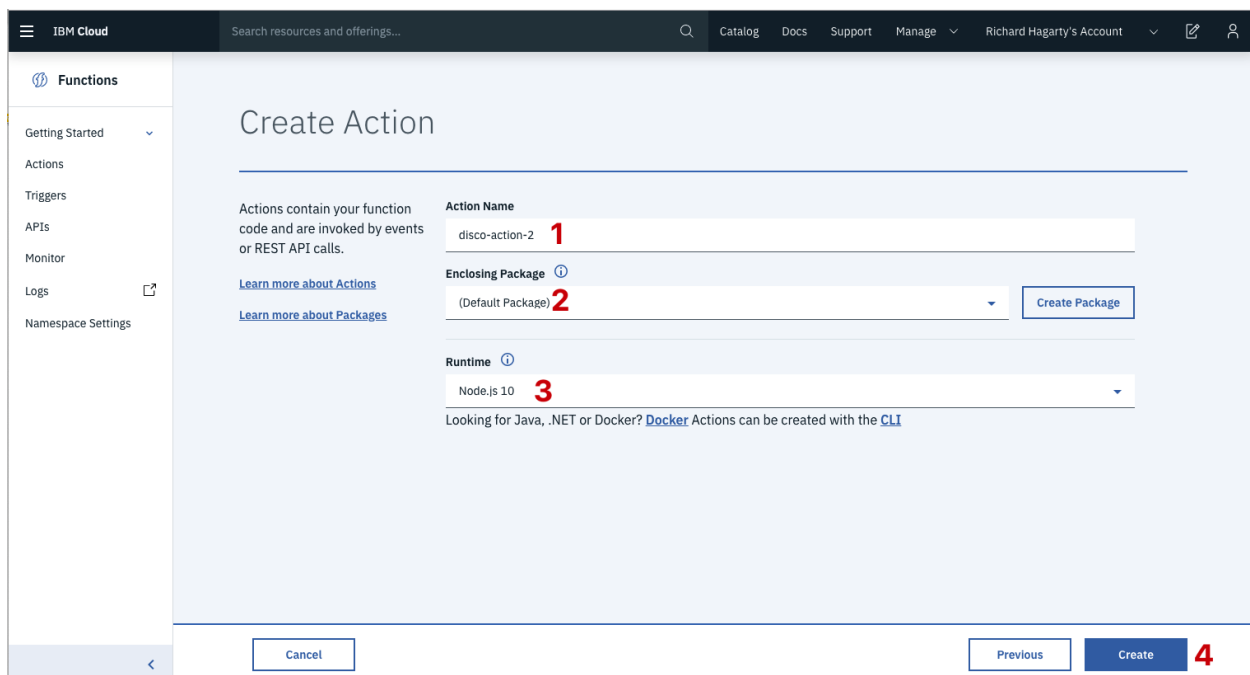
Start the IBM Cloud Functions service by selecting Create Resource from the IBM Cloud dashboard. Enter functions as the filter [1], then select the Functions card [2]:



From the Functions main panel, click on the Actions tab. Then click on Create.

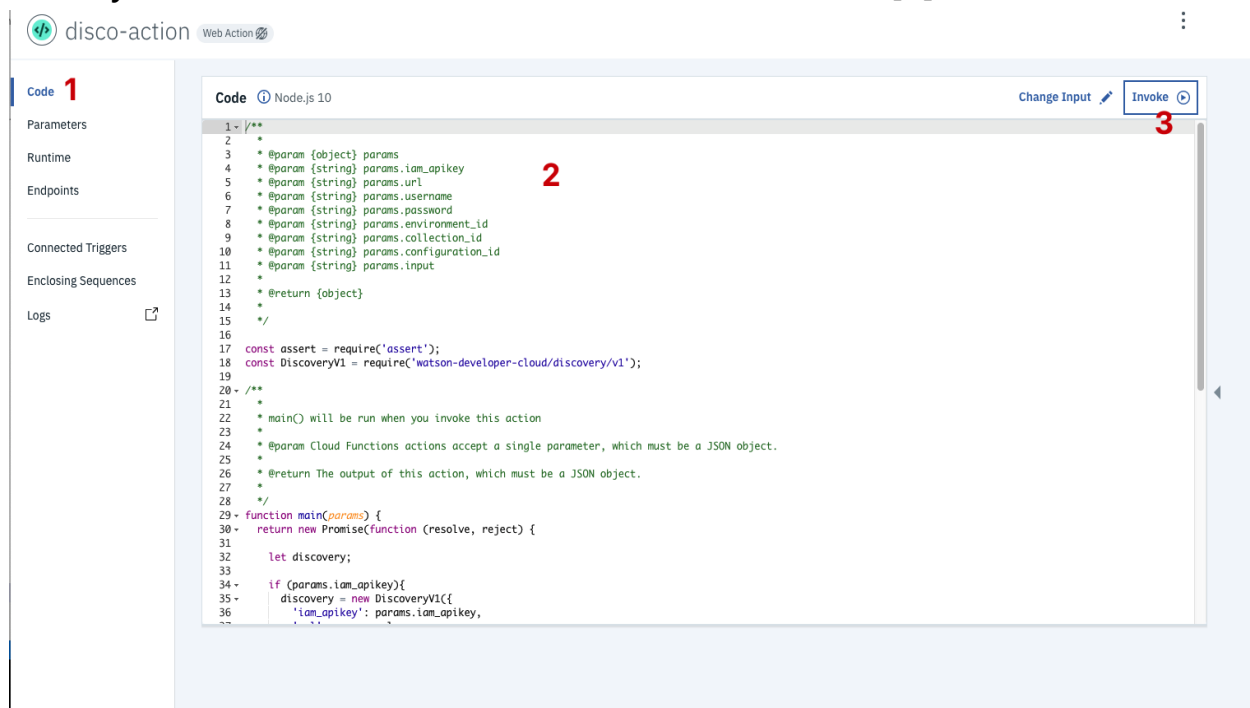
From the Create panel, select the Create Action option.

On the Create Action panel, provide a unique Action Name [1], keep the default package [2], and select the Node.js 10 [3] runtime. Click the Create button [4] to create the action.





Once your action is created, click on the Code tab [1]:



In the code editor window [2], cut and paste in the code from the disco-action.js file found in the actions directory of your local repo.

The code is pretty straight-forward - it simply connects to the Discovery service, makes a query against the collection, then returns the response.

If you press the Invoke button [3], it will fail due to credentials not being defined yet. We'll do this next.

Select the Parameters tab [1]:

The screenshot shows the 'disco-action' Web Action interface. On the left is a sidebar with navigation options: Code, Parameters (highlighted with a red '1'), Runtime, Endpoints, Connected Triggers, Enclosing Sequences, and Logs. The main area displays the 'Parameters' tab, which contains a table with four parameters. Each parameter has a name, a value, and a delete icon.

Parameter Name	Parameter Value
url	"https://gateway.watsonplatform.net/discovery/api"
environment_id	"b08a83ff-a749-4a2d-a02c-74f793d952b8"
collection_id	"6de17fa6-600d-4c03-8083-0b2a152ee328"
iam_apikey	"dryBf3aITn [REDACTED] :19Ahiau8bkoAfu10"

Add the following keys:

- url
- environment\_id
- collection\_id
- iam\_apikey

For values, please use the values associated with the Discovery service you created in the previous step.

Now that the credentials are set, return to the Code panel and press the Invoke button again.

Now you should see actual results returned from the Discovery service:

The screenshot shows the IBM Cloud Functions console for the 'disco-action' in the 'IBM Cloud Storage\_DSX-journey-2' namespace. The 'Code' tab is active, displaying a Node.js 10 script. The script includes comments and code for a function that uses the 'assert' library and a 'DiscoveryV1' class. The 'Invoke' button is visible. To the right, the 'Activations' panel shows a successful activation with an ID, timestamp, and detailed results including matching results, passages, and enriched text.

```
1- /**
2-  *
3-  * @param {object} params
4-  * @param {string} params.iam_apikey
5-  * @param {string} params.url
6-  * @param {string} params.username
7-  * @param {string} params.password
8-  * @param {string} params.environment_id
9-  * @param {string} params.collection_id
10-  * @param {string} params.configuration_id
11-  * @param {string} params.input
12-  *
13-  * @return {object}
14-  */
15- */
16-
17- const assert = require('assert');
18- const DiscoveryV1 = require('watson-developer-cloud/discovery/v1');
19-
20- /**
21-  *
22-  * @main() will be run when you invoke this action
23-  *
24-  * @param Cloud Functions actions accept a single parameter, which must be a JSON object.
25-  *
26-  * @return The output of this action, which must be a JSON object.
27-  */
28- */
29- function main(params) {
30-   return new Promise(function (resolve, reject) {
31-
32-     let discovery;
33-
34-     if (params.iam_apikey){
35-       discovery = new DiscoveryV1({
36-         'iam_apikey': params.iam_apikey,
37-         'url': params.url,
38-         'version': '2019-03-25'
39-       });
40-     }
41-   });
42- }
```

**Activations**

disco-action 1050 ms 6/6/2019, 10:45:14

**Activation ID:**  
elbfc0ff21544c85bfc0ff21549c85a1

**Results:**

```
{
  "matching_results": 14,
  "passages": [],
  "results": [
    {
      "enriched_text": {
        "categories": [
          {
            "label": "/technology and computing/operating systems",
            "score": 0.842265
          },
          {
            "label": "/technology and computing/hardware/computer",
            "score": 0.835879
          },
          {
            "label": "/technology and computing/hardware/computer peripherals/computer monitors",
            "score": 0.832254
          }
        ],
        "concepts": [
          {
            "dbpedia_resource": "http://dbpedia.org/resource/IPhone",
            "relevance": 0.917306,
            "text": "iPhone"
          },
          {
            "dbpedia_resource": "http://dbpedia.org/resource/Personal_digital_assistant",
            "relevance": 0.887088,
            "text": "Personal digital assistant"
          }
        ]
      }
    }
  ]
}
```

Next, go to the Endpoints panel [1]:

The screenshot shows the 'Endpoints' panel for the 'disco-action'. The 'Web Action' section is expanded, showing the 'Enable as Web Action' checkbox checked. Below this, there is a table for HTTP endpoints. The table has columns for HTTP METHOD, AUTH, and URL. The first row shows 'ANY' for the HTTP METHOD, 'Public' for AUTH, and a URL for the endpoint. The 'REST API' section is also visible, showing a 'POST' method with 'API-KEY' authentication and a specific URL. At the bottom, there is a 'CURL' section with a command to test the endpoint.

**Web Action**

☒ **Enable as Web Action** Allow your Cloud Functions actions to handle HTTP events. Learn more about Web Actions.

☐ **Raw HTTP handling** When enabled your Action receives requests in plain text instead of a JSON body

HTTP METHOD	AUTH	URL
ANY	Public	https://us-south.functions.cloud.ibm.com/api/v1/web/IBM%20Cloud%20Storage_DSX-journey-2/default/disco-action

**REST API**

HTTP METHOD	AUTH	URL
POST	API-KEY	https://us-south.functions.cloud.ibm.com/api/v1/namespaces/IBM%20Cloud%20Storage_DSX-journey-2/actions/disco-action

**CURL**

```
curl -u API-KEY -X POST https://us-south.functions.cloud.ibm.com/api/v1/namespaces/IBM%20Cloud%20Storage_DSX-journey-2/actions/disco-action?blocking=true
```

Click the checkbox for Enable as Web Action [2]. This will generate a public endpoint URL [3].

Take note of the URL value [3], as this will be needed by Watson Assistant in a future step.

To verify you have entered the correct Discovery parameters, execute the provided curl command [4]. If it fails, re-check your parameter values.

## **4. Configure Watson Assistant**

Launch the Watson Assistant tool and create a new dialog skill. Select the Use sample skill option as your starting point. This dialog skill contains all of the nodes needed to have a typical call center conversation with a user.

### Add new intent

The default customer care dialog does not have a way to deal with any questions involving outside resources, so we will need to add this.

Create a new intent that can detect when the user is asking about operating the Ecobee thermostat.

From the Customer Care Sample Skill panel, select the Intents tab. Click the Create intent button.

Name the intent #Product\_Information, and at a minimum, enter the following example questions to be associated with it.

#Product\_Information

Last modified 2 hours ago

Try it

Intent name

Name your intent to match a customer's question or goal. For example, #pay\_bill or #open\_account.

#Product\_Information

Description (optional)

User wants help using the thermostat

Add user example

type a user example here

Add example

Show recommendations

☐ User examples (3)

Added

0 conflicts

Show only conflicts

☐ How do I access the settings

2 hours ago

☐ How do I set the time

2 hours ago

☐ How do I turn on the heater

2 hours ago

## Create new dialog node

Now we need to add a node to handle our intent. Click on the Dialog [1] tab, then click on the drop down menu for the Small Talk node [2], and select the Add node below [3] option.

[Skills](#) /

## Customer Care Sample Skill copy

Sample simple customer service skill to get you started.

[Intents](#)

[Entities](#)

**1** [Dialog](#)

[Analytics](#)

[Options](#)

[Versions](#)

[Content Catalog](#)



### Directions and location



#Customer\_Care\_Store\_Location

3 Responses / 0 Context Set / Skip user input / Returns

### Make an appointment



#Customer\_Care\_Appointments

3 Responses / 7 Context Set / 5 Slots / Does not return



### Transfer to agent



#General\_Connect\_to\_Agent

1 Responses / 0 Context Set / Does not return



### Small Talk



3 Dialog nodes / No digressions

### anything\_else

1 Responses / 0 Context Set / Returns

[Add node to folder](#)

Add node above

Add node below

Add folder

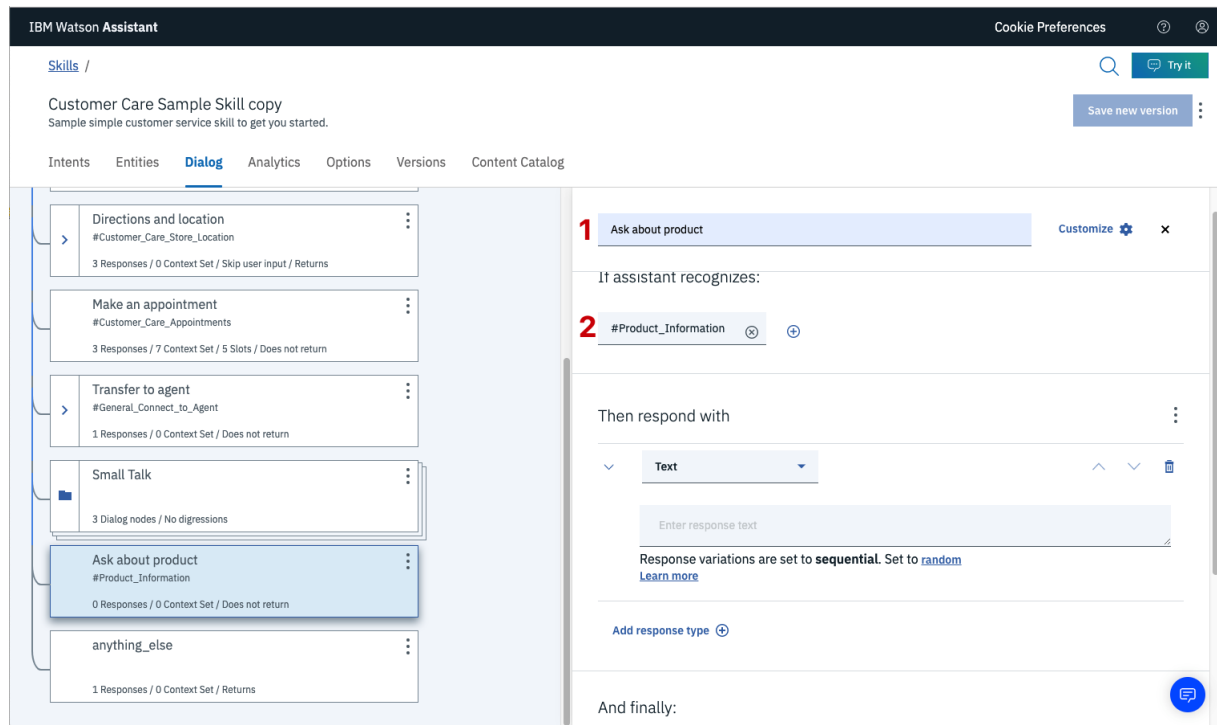
Move

Duplicate

Jump to

Delete

Name the node "Ask about product" [1] and assign it our new intent [2].

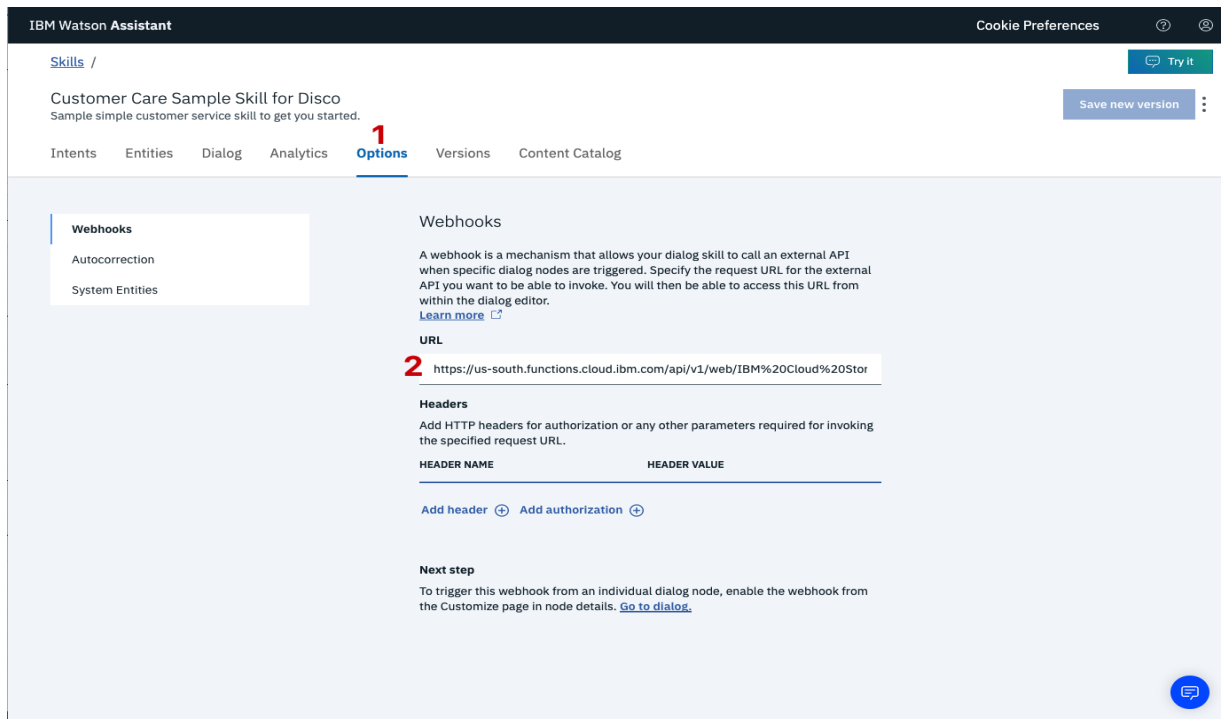


This means that if Watson Assistant recognizes a user input such as "how do I set the time?", it will direct the conversation to this node.

Enable webhook from Assistant

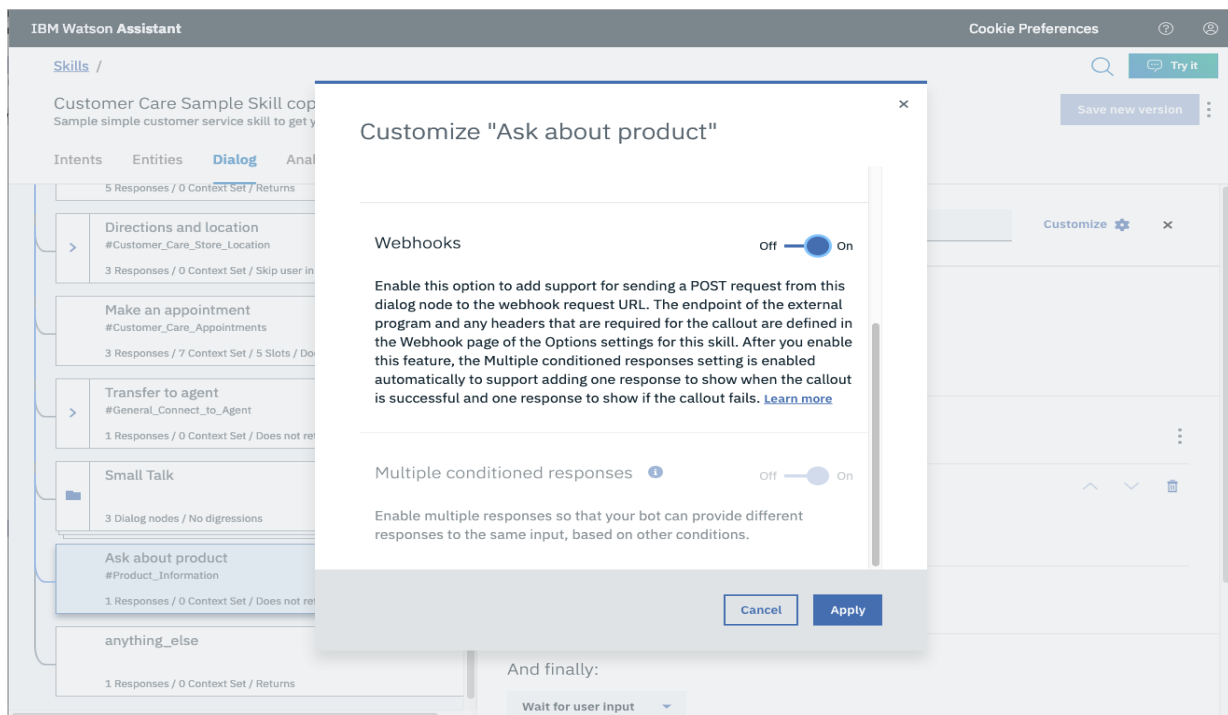
Set up access to our WebHook for the IBM Cloud Functions action you created in Step #4.

Select the Options tab [1]:



Enter the public URL endpoint for your action [2].

Return to the Dialog tab, and click on the Ask about product node. From the details panel for the node, click on Customize, and enable Webhooks for this node:





Click Apply.

The dialog node should have a Return variable [1] set automatically to \$webhook\_result\_1.

This is the variable name you can use to access the result from the Discovery service query

The screenshot shows the IBM Watson Assistant interface for a skill named 'Customer Care Sample Skill for Disco'. The 'Dialog' tab is selected, showing a list of dialog nodes on the left. The node 'Ask about product' is highlighted, showing its configuration on the right. The configuration includes a trigger phrase 'Ask about product', a list of recognized entities including '#Product\_Information', and a callout to a webhook. The 'Parameters' section shows a table with a key 'input' and a value '<?input.text?>'. The 'Return variable' section shows a variable '\$webhook\_result\_1'.

KEY	VALUE
input	"<?input.text?>"

Return variable  
1 \$webhook\_result\_1

You will also need to pass in the users question via the parameter input [2]. The key needs to be set to the value: "<?input.text?>"

If you fail to do this, Discovery will return results based on a blank query. Optionally, you can add these responses to aid in debugging:

#### Return variable

\$webhook\_result\_1

Then respond with

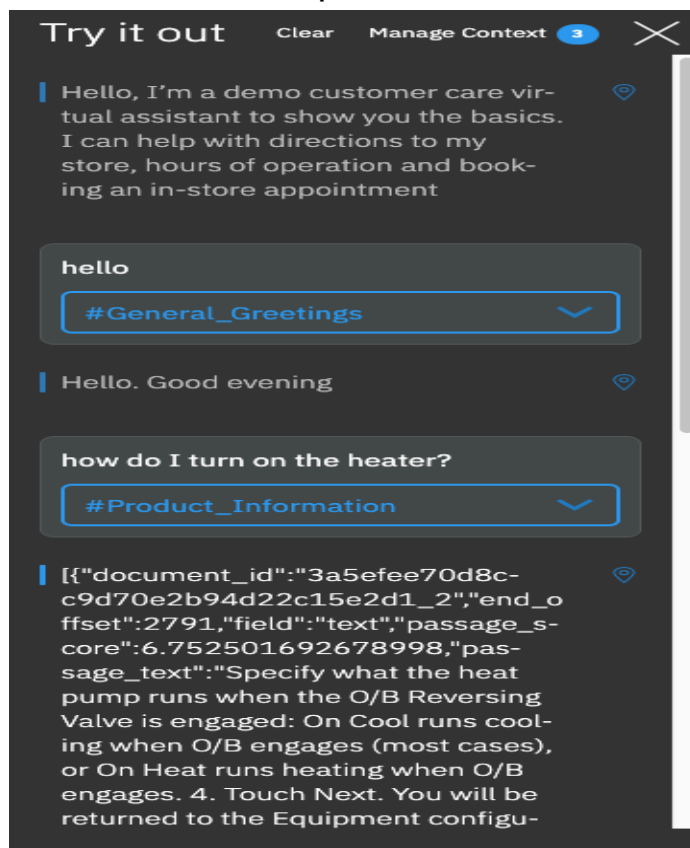
	IF ASSISTANT RECOGNIZES	RESPOND WITH		
1	\$webhook_result_1	\$webhook_result_1	⚙️	🗑️
2	anything_else	Try again later	⚙️	🗑️

[Add response](#) (+)

## Test in Assistant Tooling

From the Dialog panel, click the Try it button located at the top right side of the panel.

Enter some user input:



Note that the input "how do I turn on the heater?" has triggered our Ask about product dialog node, which is indicated by the #Product\_Information response.

And because we specified that \$webhook\_result\_1.passages be the response, that value is displayed also.

You can also verify that the call was successfully completed by clicking on the Manage

Context button at the top right. The response from the Discovery query will be stored in the \$webhook\_result\_1 variable:

Context variables ⓘ

✕

\$Enter variable name

\$timezone

⊖

"America/Los\_Angeles"

\$webhook\_result\_1

⊖

{"matching\_results":9,"passages":[{"do

\$no\_reservation

⊖

true

## 5. Create flow and configure node:

Integration of watson assistant in Node-RED

- Double-click on the Watson assistant node
- Give a name to your node and enter the username, password and workspace id

of your Watson assistant service

The screenshot shows the 'Edit assistant node' configuration panel in Node-RED. The panel is titled 'Edit assistant node' and has a 'Deploy' button in the top right corner. It contains a 'Delete' button, a 'Cancel' button, and a red 'Done' button. The 'Properties' section is active, showing fields for Name, Username, Password, API Key, Service Endpoint, Workspace ID, and Timeout Period. The 'Name' field is set to 'Help-desk'. The 'Username' field is set to 'Username'. The 'Password' field is set to 'Password'. The 'API Key' field is set to '.....'. The 'Service Endpoint' field is set to 'https://api.eu-gb.assistant.watson.cloud.ibm.com'. The 'Workspace ID' field is set to '9af8a93f-8126-4977-a951-6ca2e132a264'. The 'Timeout Period' field is set to 'Leave empty to disable'. There are also checkboxes for 'Save context' (checked), 'Multiple Users', 'Permit Empty Payload', and 'Opt Out Request Logging'. A note at the bottom states: 'Note: When using with multiple users, msg.user must be set. See info box for details.' The right sidebar shows the 'info' tab for the 'Help-desk' node, with fields for Node ID, Name, Type, Description, and Node Help. The Node ID is 'f19e2a93.ac70a'. The Name is 'Help-desk'. The Type is 'watson-conversa'. The Description is 'With the IBM Watson™ Assistant can create cognitive agents – virt that combine machine learning, n language understanding, and inte dialog scripting tools to provide o customer engagements.' The Node Help section contains the text: 'This node should be provided in i' and a list of usage instructions: '• msg.payload : the message Assistant to analyse. Format: • msg.user (optional): unique the user. This will be used to'. The bottom of the sidebar has a search bar labeled 'Search for nodes using'.

**Edit assistant node**

Delete Cancel Done

**Properties**

Name Help-desk

Username Username

Password Password

API Key .....

Service Endpoint https://api.eu-gb.assistant.watson.cloud.ibm.com

Workspace ID 9af8a93f-8126-4977-a951-6ca2e132a264

Timeout Period Leave empty to disable

☒ Save context

☐ Multiple Users

☐ Permit Empty Payload

☐ Opt Out Request Logging

**Note:** When using with multiple users, `msg.user` must be set. See info box for details.

☐ Enabled

**info**

**Information**

Node f19e2a93.ac70a

Name Help-desk

Type watson-conversa

**Description**

**Node Help**

With the IBM Watson™ Assistant can create cognitive agents – virt that combine machine learning, n language understanding, and inte dialog scripting tools to provide o customer engagements.

**Usage**

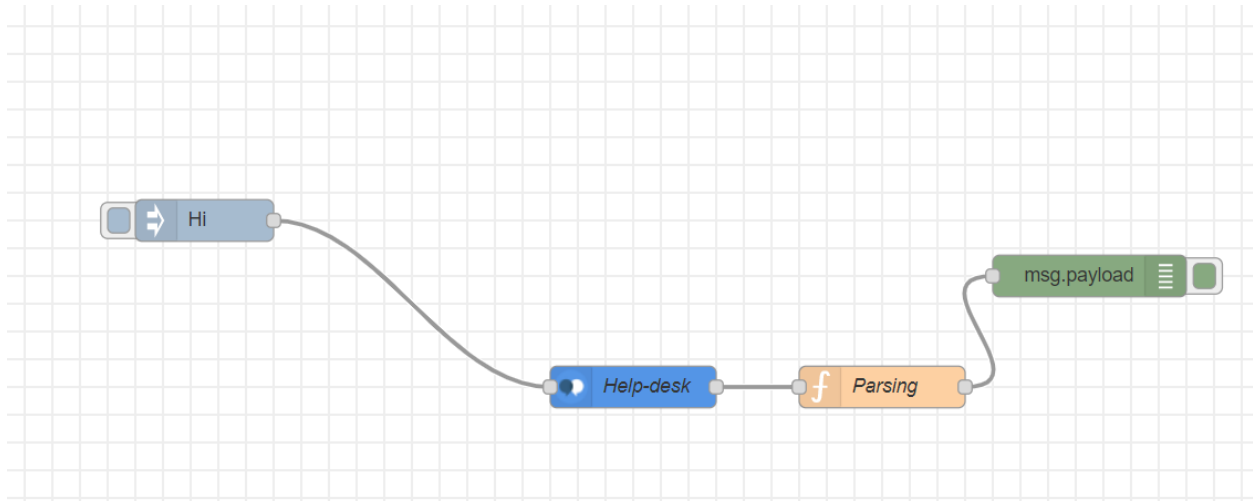
This node should be provided in i

- `msg.payload` : the message Assistant to analyse. Format:
- `msg.user` (optional): unique the user. This will be used to

Search for nodes using

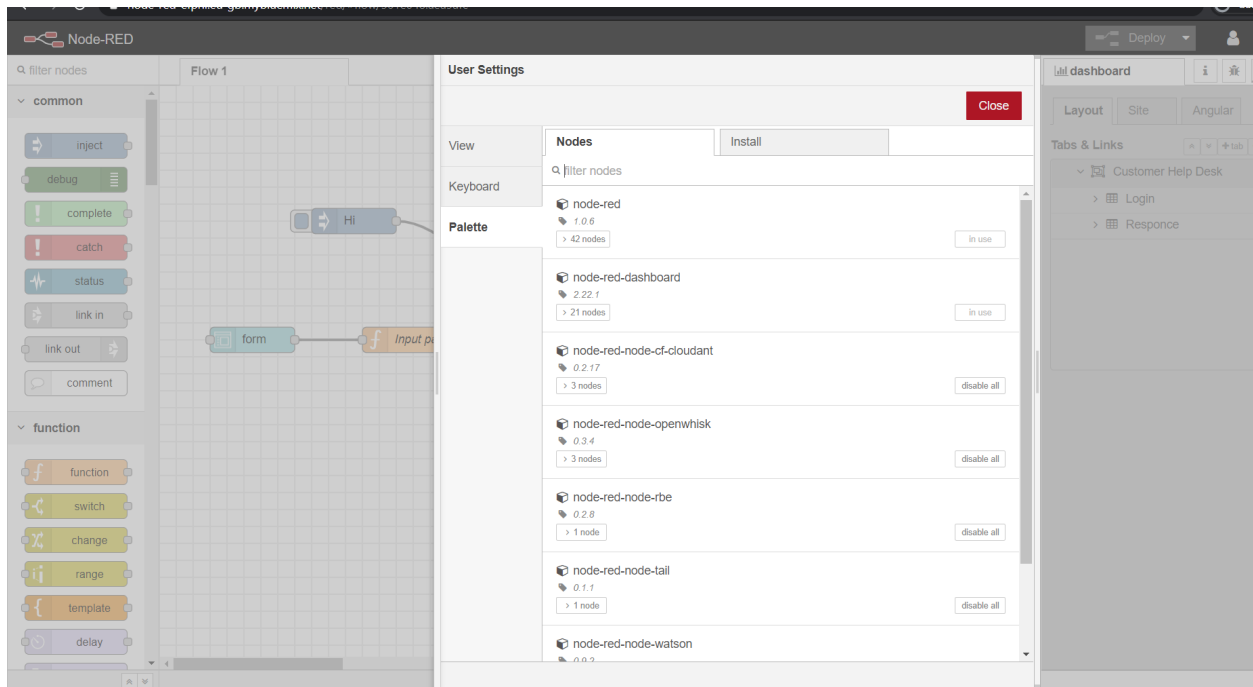
- After entering all the information click on Done
- Drag inject node on to the flow from the Input section
- Drag Debug on to the flow from the output section
- Double-click on the inject node

- Select the payload as a string
- Enter a sample input to be sent to the assistant service and click on done
- Connect the nodes as shown below and click on Deploy



Open Debug window as shown below

- Click on the button to send input text to the assistant node
- Observe the output from the assistant service node
- The Bot output is located inside "output.text"
- Drag the function node to parse the JSON data and get the bot response
- Double click on the function node and enter the JSON parsing code as shown
- below and click on done • Connect the nodes as shown below and click on Deploy
- Re-inject the flow and observe the parsed output
- For creating a web application UI we need "dashboard" nodes which should be installed manually.
- Go to navigation pane and click on manage palette



- Click on install
- Search for “node-red-dashboard” and click on install and again click on install on the prompt
- The following message indicates dashboard nodes are installed, close the manage palette
- Search for “Form” node and drag on to the flow
- Double click on the “form” node to configure
- Click on the edit button to add the “Group” name and “Tab” name
- Click on the edit button to add tab name to web application
- Give sample tab name and click on add do the same thing for the group
- Give the label as “Enter your input”, Name as “text” and click on Done
- Drag a function node, double-click on it and enter the input parsing code as shown below

**Edit function node**

Delete Cancel Done

**Properties**

**Name** Input parsing

**Function**

```
1 msg.payload=msg.payload.question;
2 return msg;
```

**Outputs** 1

☐ Enabled

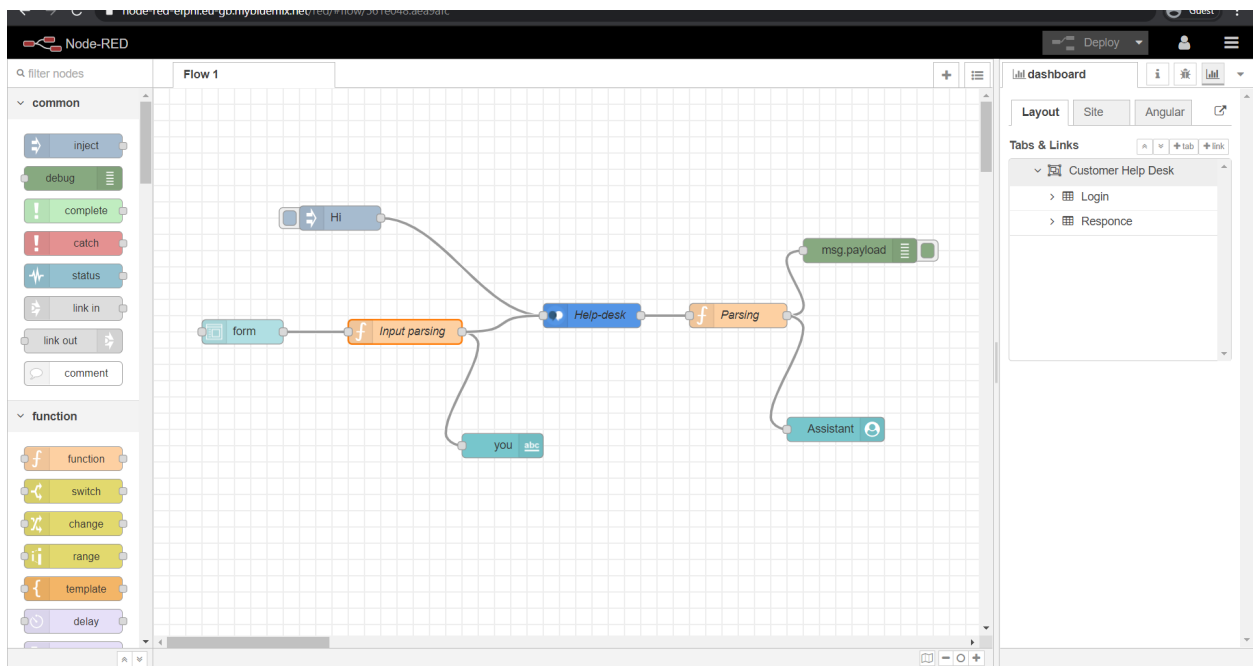
- Click on done
- Connect the form output to the input of the function node and output of the function to input of assistant node
- Search for “text” node from the “dashboard” section
- Drag two “text” nodes on to the flow
- Double click on the first text node, change the label as “You” and click on Done
- Double click on the second text node, change the label as “Bot” and click on Done
- Connect the output of “input parsing” function node to “ You” text node and
- output of “Parsing” function node to the input of “Bot” text node
- Click on Deploy

## 5.FLOWCHART

At first go to manage pallette and install dashboard.

Now,Create the flow with the help of following node:

- ☐ Inject
- ☐ Assistant
- ☐ Debug
- ☐ Function
- ☐ Ui\_Form
- ☐ Ui\_Text





## 6.RESULTS

Finally our Node-RED dash board integrates all the components and displayed in the Dashboard UI by typing URL -

<https://node-red-efpnl.eu-gb.mybluemix.net/ui> in browser

The screenshot shows a web browser window with the title "Customer Help Desk". The address bar displays the URL <https://node-red-efpnl.eu-gb.mybluemix.net/ui/#/0?socketid=fHfZ33zzDS9QbbJPAAAAa>. The page has a blue header bar with the text "Customer Help Desk". Below the header, there are two main sections: "Login" and "Response".

**Login Section:**

- Full Name \*: Joey
- Email \*: joey@gmail.com
- Your Question \*: what is HVAC system?
- Buttons: SUBMIT, CANCEL

**Response Section:**

you  
what is HVAC system?

Assistant

This option only appears if auxiliary heat is configured in the Equipment menu. ☐ Off: Turn the system off. When the system is off, only the current temperature will be displayed on the Home screen. On Thermostat and Mobile: Select Main Menu > System > HVAC System On Web: Select System tile > HVAC

The screenshot shows a web browser window with the title "Customer Help Desk". The address bar displays the URL <https://node-red-efpnl.eu-gb.mybluemix.net/ui/#/0?socketid=fHfZ33zzDS9QbbJPAAAAa>. The page has a blue header bar with the text "Customer Help Desk". Below the header, there are two main sections: "Login" and "Response".

**Login Section:**

- Full Name \*: Joey
- Email \*: joey@gmail.com
- Your Question \*: How to customize thermostat?
- Buttons: SUBMIT, CANCEL

**Response Section:**

you  
How to customize thermostat?

Assistant

This is useful if you have multiple systems or zones and are accessing your thermostat from your personalized web portal. On Thermostat: 1. Select Main Menu > Settings > Preferences 2. Select Thermostat name. 3. Select an existing name from the list or choose Enter your own. 4. Touch Save. 5. If you choose your own name, enter the custom name and touch Save.

## **7.ADVANTAGES & DISADVANTAGES**

### **Advantages:**

- Companies can deploy chatbots to rectify simple and general human queries .
- Reduces man power
- Cost efficient
- No need to divert calls to customer agent and customer agent can look on other works.

### **Disadvantages:**

- Some times chatbot can mislead customers
- Giving same answer for different sentiments.
- Some times cannot connect to customer sentiments and intentions.

## **8.APPLICATIONS**

- It can deploy in popular social media applications like facebook,slack,telegram.
- Chatbot can deploy any website to clarify basic doubts of viewers.

## **9.CONCLUSION**

By doing the above procedure and all we successfully created Intelligent helpdesk smart chatbot using Watson assistant, Watson discovery, Node-RED and cloud-functions.

## 10.FUTURE SCOPE

We can include watson studio text to speech and speech to text services to access the chatbot handsfree. This is one of the future scope of this project.

## 11. BIBILOGRAPHY

### APPENDIX

#### Source Code

##### 1.Cloud Function(Node.js)

```
/**
 *
 * @param {object} params
 * @param {string} params.iam_apikey
 * @param {string} params.url
 * @param {string} params.username
 * @param {string} params.password
 * @param {string} params.environment_id
 * @param {string} params.collection_id
 * @param {string} params.configuration_id
 * @param {string} params.input
 *
 * @return {object}
 */
```

```
const assert = require('assert');
const DiscoveryV1 = require('watson-developer-cloud/discovery/v1');
/**
 *
 * main() will be run when you invoke this action
 *
 * @param Cloud Functions actions accept a single parameter, which must
be a JSON object.
 *
 * @return The output of this action, which must be a JSON object.
 */
function main(params) {
  return new Promise(function (resolve, reject) {
    let discovery;
    if (params.iam_apikey){
      discovery = new DiscoveryV1({
        'iam_apikey': params.iam_apikey,
        'url': params.url,
        'version': '2020-05-09'
      });
    }
    else {
      discovery = new DiscoveryV1({
        'username': params.username,
        'password': params.password,
        'url': params.url,
        'version': '2020-05-11'
      });
    }
    discovery.query({
      'environment_id': params.environment_id,
```

```

'collection_id': params.collection_id,
'natural_language_query': params.input,
'passages': true,
'count': 3,
'passages_count': 3
}, function(err, data) {
if (err) {
return reject(err);
}
return resolve(data);
});
});
}

```

## 2. Node Red (flows.json)

```

[{"id": "561e048.aea9afc", "type": "tab", "label": "Flow
1", "disabled": false, "info": "", {"id": "1f55072d.03e419", "type": "ui_base", "theme": {"name": "the
me-light", "lightTheme": {"default": "#0094CE", "baseColor": "#5c9e30", "baseFont": "Times
New
Roman, Times, serif", "edited": true, "reset": false}, "darkTheme": {"default": "#097479", "baseCol
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UI, Roboto, Oxygen-Sans, Ubuntu, Cantarell, Helvetica
Neue, sans-serif", "edited": false}, "customTheme": {"name": "Untitled Theme
1", "default": "#4B7930", "baseColor": "#4B7930", "baseFont": "-apple-system, BlinkMacSyste
mFont, Segoe UI, Roboto, Oxygen-Sans, Ubuntu, Cantarell, Helvetica
Neue, sans-serif"}, "themeState": {"base-color": {"default": "#0094CE", "value": "#5c9e30", "edit
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ffff", "edited": false}, "group-text-color": {"value": "#81ca51", "edited": false}, "group-border-color": {"value": "#ffffff", "edited": false}, "group-background-color": {"value": "#ffffff", "edited": false}, "widget-text-color": {"value": "#111111", "edited": false}, "widget-background-color": {"value": "#5c9e30", "edited": false}, "widget-border-color": {"value": "#ffffff", "edited": false}, "base-font": {"v
alue": "Times New

```

Roman,Times,serif"}},{"angularTheme":{"primary":"indigo","accents":"blue","warn":"red","background":"grey"}},{"site":{"name":"Customer Help Desk","hideToolbar":"false","allowSwipe":"false","lockMenu":"false","allowTempTheme":"none","dateFormat":"DD/MM/YYYY","sizes":{"sx":55,"sy":55,"gx":6,"gy":6,"cx":10,"cy":20,"px":0,"py":0}}},{id:"cbe9ad9d.01cbc","type":"ui\_tab","z":"","name":"Customer Help Desk","icon":"dashboard","disabled":false,"hidden":false},{id:"347634ab.8cb16c","type":"ui\_group","z":"","name":"Login","tab":"cbe9ad9d.01cbc","order":1,"disp":true,"width":"8","collapse":false},{id:"8e59a96d.c582c8","type":"ui\_group","z":"","name":"Responce","tab":"cbe9ad9d.01cbc","order":2,"disp":true,"width":"14","collapse":false},{id:"b1b11140.4e4ef","type":"inject","z":"561e048.aea9afc","name":"","topic":"","payload":"Hi","payloadType":"str","repeat":"","crontab":"","once":false,"onceDelay":"","x":230,"y":160,"wires":[["f19e2a93.ac70a8"]]},{"id":"f2f2649a.0d0d98","type":"debug","z":"561e048.aea9afc","name":"","active":true,"tosidebar":true,"console":false,"tostatus":false,"complete":"payload","targetType":"msg","x":870,"y":200,"wires":[]},{id:"3c146a05.4c67a6","type":"ui\_form","z":"561e048.aea9afc","name":"","label":"","group":"347634ab.8cb16c","order":1,"width":0,"height":0,"options":{"label":"Full Name","value":"name","type":"text","required":true,"rows":null},{label":"Email","value":"email","type":"email","required":true,"rows":null},{label":"Your Question","value":"question","type":"text","required":true,"rows":null}],"formValue":{"name":"","email":"","question":"","payload":"","submit":"submit","cancel":"cancel","topic":"","x":110,"y":300,"wires":[["df401b2f.fdba58"]]},{"id":"e5498170.e0c6c","type":"ui\_text","z":"561e048.aea9afc","group":"8e59a96d.c582c8","order":1,"width":0,"height":0,"name":"","label":"you","format":"{{msg.payload}}","layout":"col-center","x":430,"y":440,"wires":[]},{id:"f19e2a93.ac70a8","type":"watson-conversation-v1","z":"561e048.aea9afc","name":"Help-desk","workspaceid":"9af8a93f-8126-4977-a951-6ca2e132a264","multiuser":false,"context":true,"empty-payload":false,"service-endpoint":"https://api.eu-gb.assistant.watson.cloud.ibm.com/instances/14773828-1506-41ff-974c-c6853dfc0205","timeout":"","optout-learning":false,"x":540,"y":280,"wires":[["b150b281.0d091"]]},{"id":"df401b2f.fdba58","type":"function","z":"561e048.aea9afc","name":"Input parsing","func":"msg.payload=msg.payload.question;\nreturn msg;","outputs":1,"noerr":0,"x":310,"y":300,"wires":[["e5498170.e0c6c","f19e2a93.ac70a8"]]},{"id":"b150b281.0d091","type":"function","z":"561e048.aea9afc","name":"Parsing","func":"msg.payload=msg.payload.output.text[0]\nreturn msg;","outputs":1,"noerr":0,"x":720,"y":280,"wires":[["f2f2649a.0d0d98","39afcc7.445f634"]]},{"id":"39afcc7.445f634","type":"ui\_text","z":"561e048.aea9afc","group":"8e59a96d.c582c8","order":3,"width":0,"height":0,"name":"","label":"Assistant","format":"{{msg.payload}}","layout":"col-center","x":840,"y":420,"wires":[],"icon":"font-awesome/fa-user-circle")]

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