# watsonx.ai integration with IBM watsonx Assistant to enable Gen AI

The goal of this exercise is to show how you can leverage and integrate watsonx.ai LLMs to add Generative AI capabilities to your assistant. We are going to create a travel assistant with watsonx Assistant and use a Large Language Model (LLM) to generate the travel information.

## 1. Obtain the watsonx.ai OpenAPI file

1. Download the watsonx-openapi.zip and extract the **watsonx-openapi.json** file. You will use this watsonx.ai OpenAPI enpoint file later in this exercise.

## 2. Get your watsonx.ai project ID

1. Log in to the watsonx.ai platform (https://dataplatform.cloud.ibm.com/wx/home?context=wx) with the email you use to access your IBM Cloud account.
2. From the navigation menu at the top-left corner, select **View all projects**.
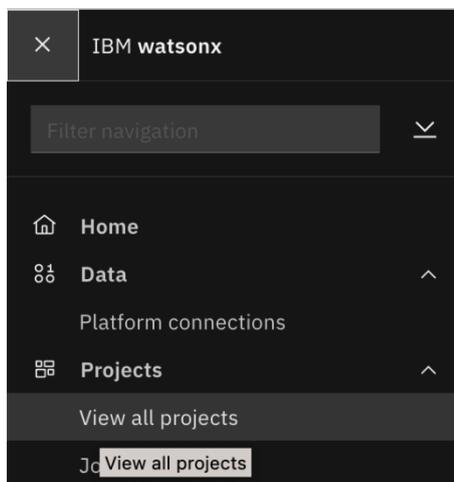


3. Select **New Project > Create an empty project**.
4. Give the project any name. In the **Storage** panel, "watsonx – Challenge COS" will be pre-selected for you by default.
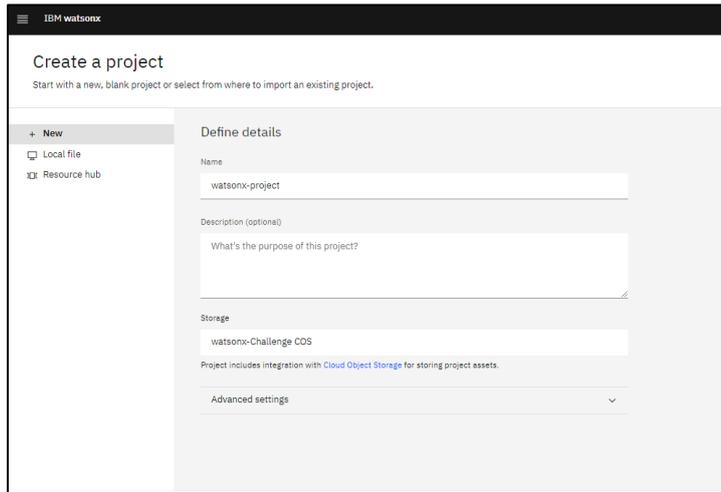
5. Click **Create**. You will be taken to the project's overview dashboard.
6. Select the **Manage** tab on your project dashboard, select the **Services & integrations** on the left pane, and click **Associate service +**.
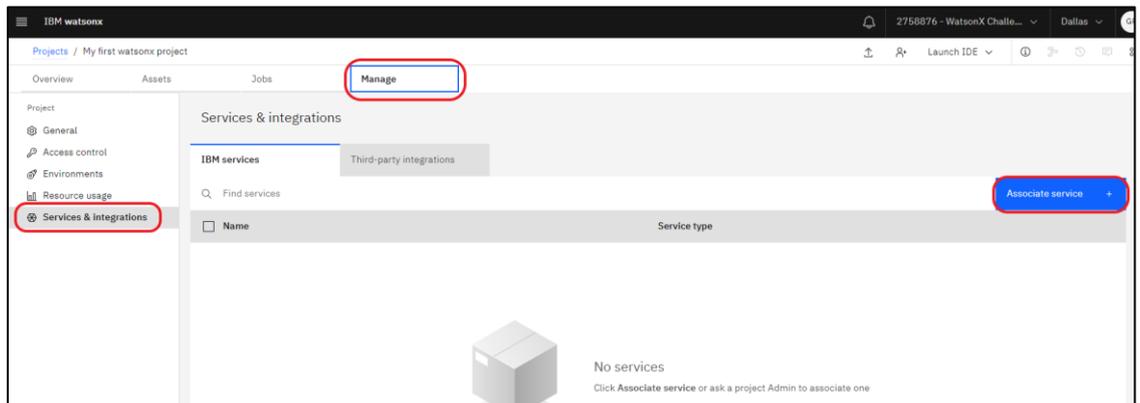


7. From the list of services, select the "**watsonx-Challenge WML**" Watson Machine Learning instance and then click **Associate** button to complete associating the machine learning service.
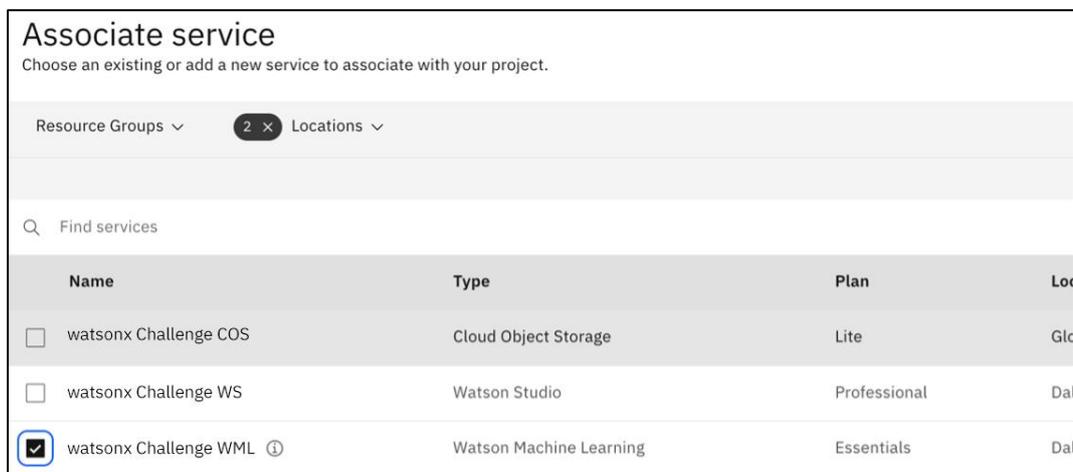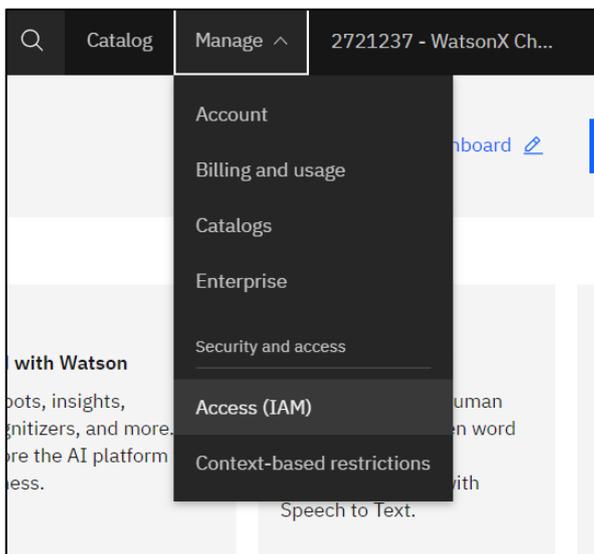
8. In the same Manage tab, select **General** on the left pane. Copy and note down the Project ID value. This value will be used later in this exercise.
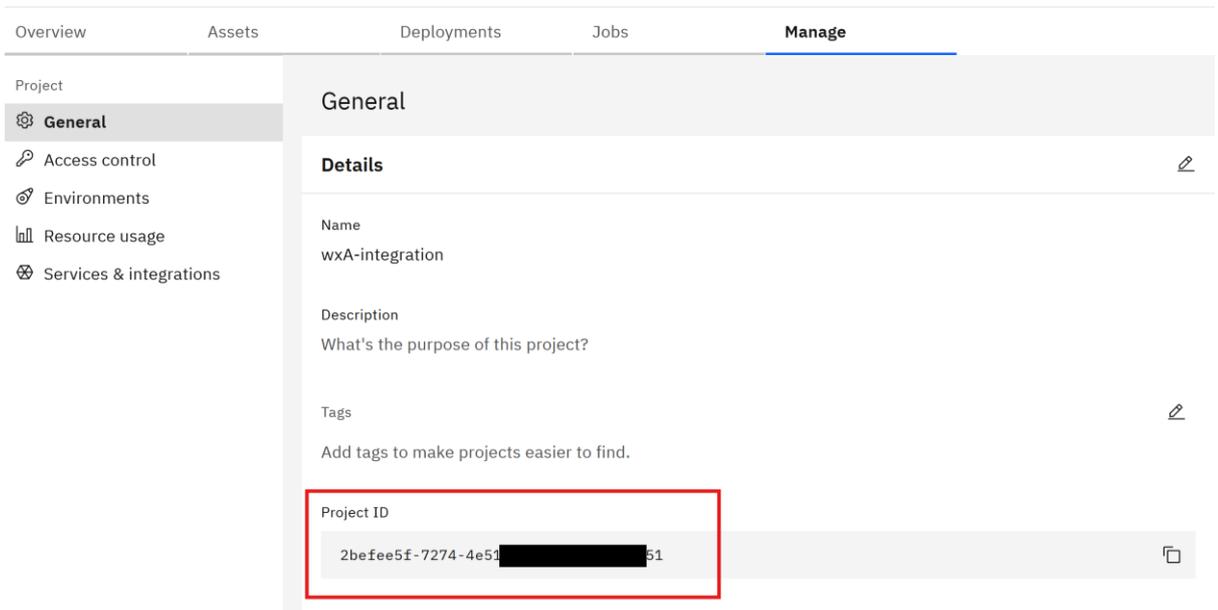


## 3. Create an IBM Cloud API key

1. Go to your IBM Cloud account dashboard.

2. Select **Manage > Access (IAM)** at the top of the IBM Cloud dashboard.



3. Select **API keys** on the left pane and click the **Create +** button.

4. Give a name for the API key, enter optional description, select **Yes** for the **Session creation** and click the **Create** button.

5. An API key will be created. Download and save the file in a secure path for future references.



## 4. Create a new assistant

1. If you have an existing assistant already created, create a new assistant for this exercise. In your watsonx Assistant home page, select your assistant drop down at the top of the dashboard and select **Create New +**.
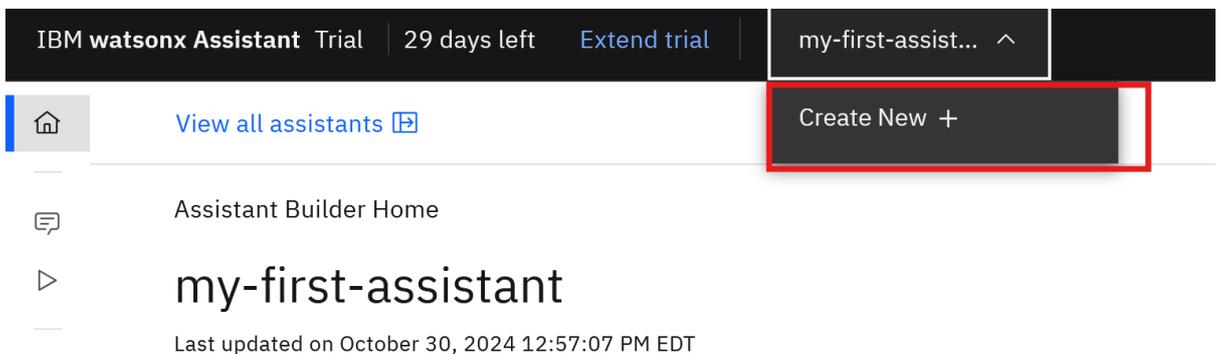
2. Enter a name for your travel assistant, optional description and click the **Create assistant** button.

Create a new assistant                                                           ✕

Assistant name

Travel assistant

Your assistant name will be kept internally and not visible to your customers

Description (optional)                                                          0/128

Add a description for this assistant

Assistant language

English (US)                                                                      ⌄

This is the language your assistant will speak.

| Cancel | Create assistant |
|---|---|

3. A new travel assistant will be created, and you will be navigated to its home page. Note, you can always switch between assistants by selecting the assistant drop down at the top of the dashboard.

IBM **watsonx Assistant**  Trial  │  29 days left    Extend trial       Travel assistan...  ⌄

⌂  View all assistants ⊞

Assistant Builder Home

Travel assistant

Last updated on October 30, 2024 7:12:29 PM EDT

ⓘ  Your assistant now has new watsonx generative AI features! Learn more about intelligent information gathering.

**Enhance your assistant**

Further improve and customize your assistant with these recommendations.

**Build actions**

Enhance and improve your assistant's actions.

→

**Customize your greeting**

Welcome your users in a unique way that aligns with your brand.

→

Crea

Trai
adap
situa

**Assistant architecture**

Here's an overview that depicts the structure of your assistant.

◻ **Default beh**

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## 5. Add a new custom extension for watsonx.ai LLM integration

1. On the left navigation menu, select **Integrations**.
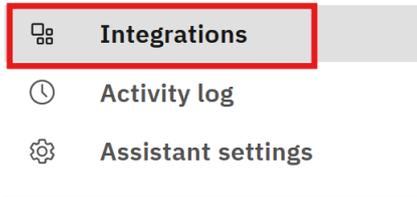
2. Scroll down to the section called **Extensions** and click on the **Build custom extension** button.
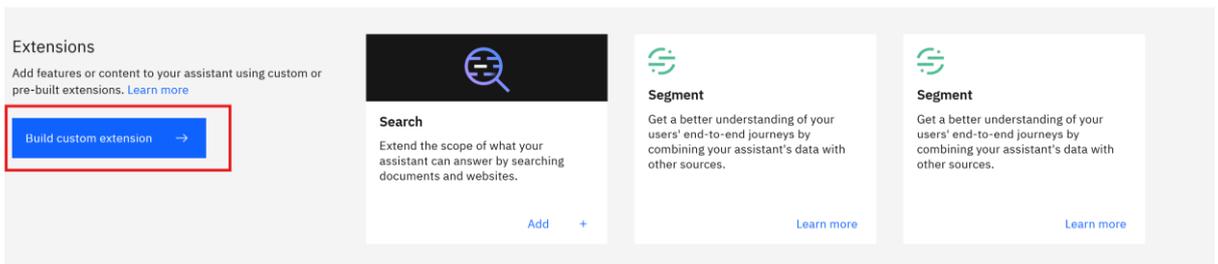
3. Review the Get Started steps and click the **Next** button.

4. Enter an extension name (example: wx-ai-custom-extension) with optional description and click the **Next** button.

5. Import the watsonx.ai OpenAPI file (watsonx-openapi.json) that was previously downloaded in Step 1. Obtain the watsonx.ai OpenAPI file of this exercise and click the **Next** button.
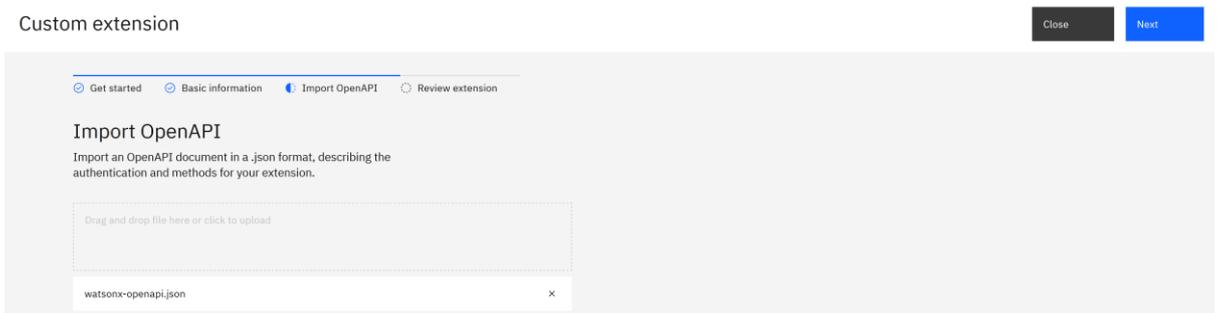
6. Review the extension details and click the **Finish** button.

7. Notice that a new **wx-ai custom extension** will be created in the Extensions section. Click the **Add +** button. A pop-up will appear. Click the **Add** button again to confirm.
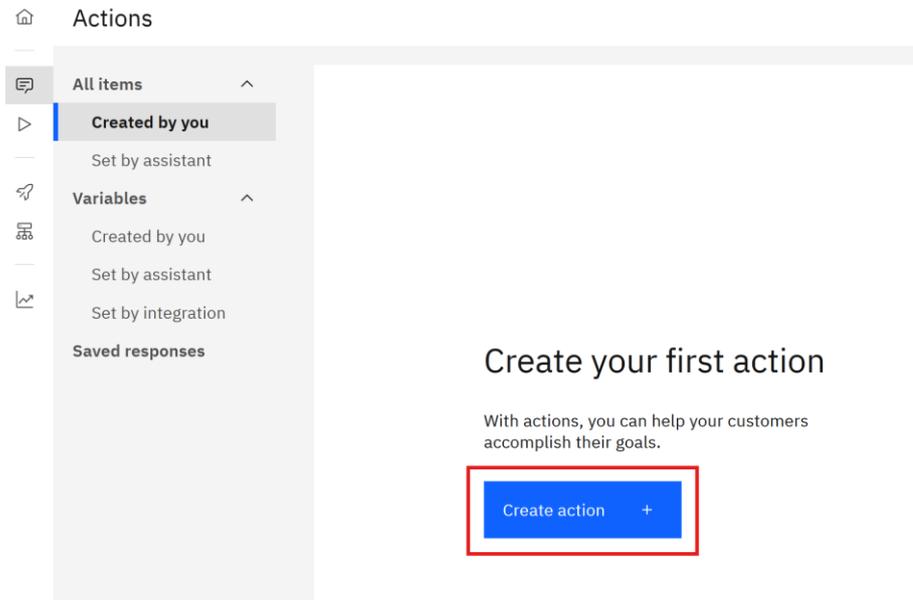
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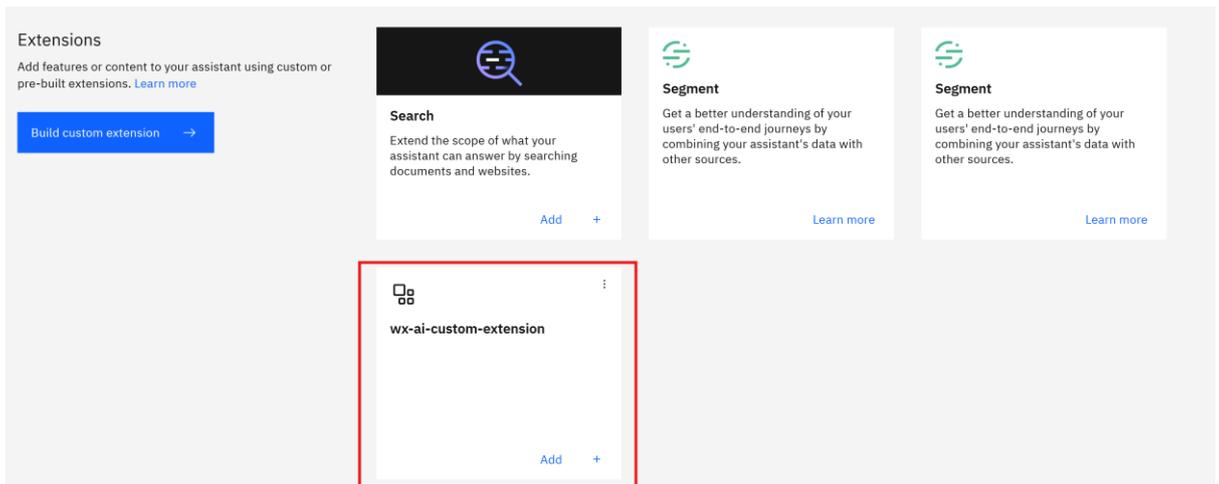
8. Review the Get Started steps and click the **Next** button.

9. In the **Authentication** setting panel:

   a. Configure the Authentication type as OAuth 2.0

   b. In the **Apikey** field, enter the IBM Cloud API key that you created and saved in Step 3. Create an IBM Cloud API key of this exercise.
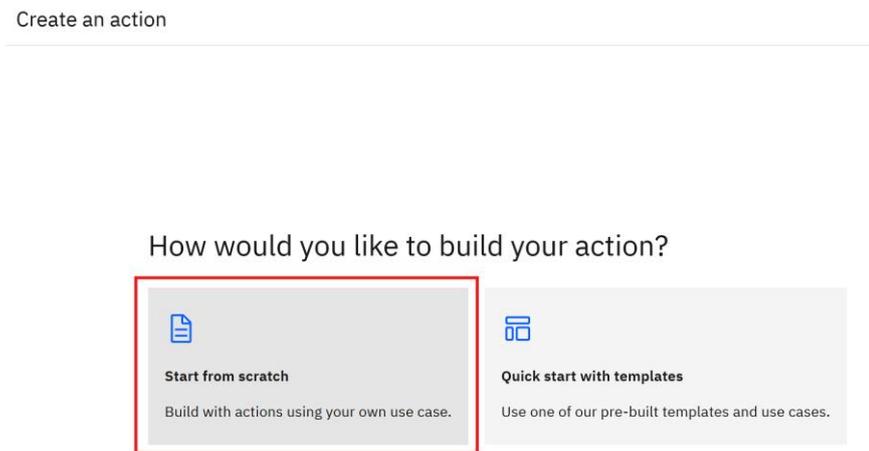
   c. Click the **Next** button.
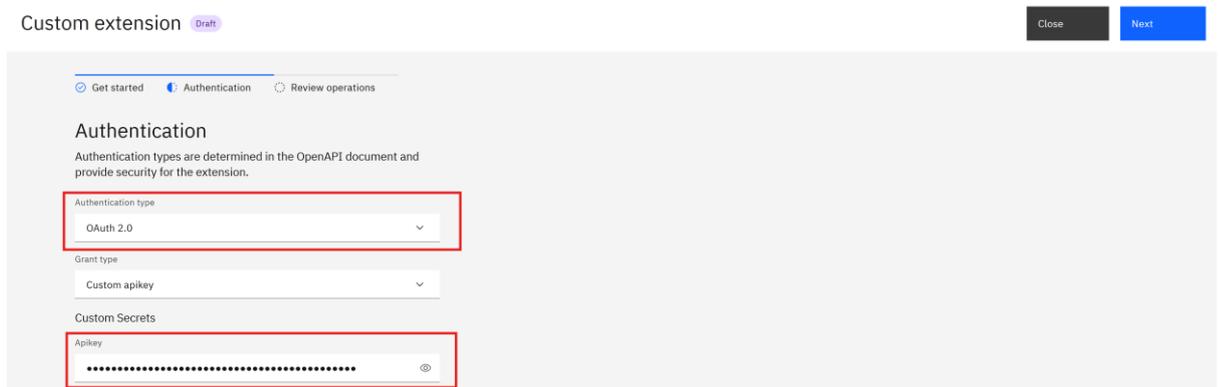


10. Review operations and click the **Finish** button. The watsonx.ai extension is now successfully integrated, and you can click the **Close** button if you are not automatically navigated to the **Extensions** page.
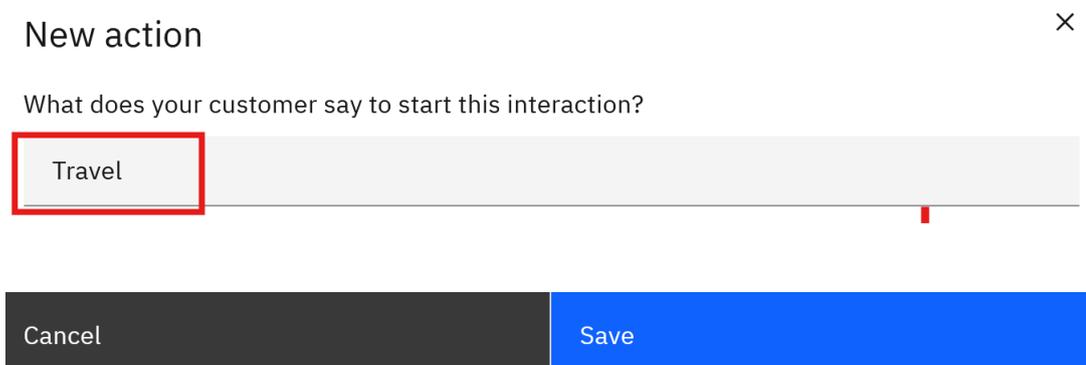
# 6. Create an action

1. Let's create an action for the travel assistant. On the left navigation menu, select Actions and select **Create action +** button.

Actions

All items ∧
Created by you
Set by assistant
Variables ∧
Created by you
Set by assistant
Set by integration
Saved responses

### Create your first action

With actions, you can help your customers accomplish their goals.

Create action +

2. Select the **Start from scratch** option.

Create an action

### How would you like to build your action?

Start from scratch
Build with actions using your own use case.

Quick start with templates
Use one of our pre-built templates and use cases.

3. You need to "train" your assistant's topic-recognition AI by giving it some example sentences to start an interaction. Enter "Travel" and select the **Save** button.

### New action ✕

What does your customer say to start this interaction?

Travel

Cancel                    Save

You can add more example sentences later.

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# 7. Create first conversation step

Now it's time to create the first step in the Travel interaction.

1.  A blank first step is already created for you. Select the **Edit step tile** pencil icon next to Step 1 text and enter "Specify country" as title. Let's add a clarification question in the **Assistant says** text box and enter "What country would you like to travel to?". Expand the **Define customer response** drop down and select **Free Text**. Select the save button on top right of the page. Finally, Step 1 should like below image.
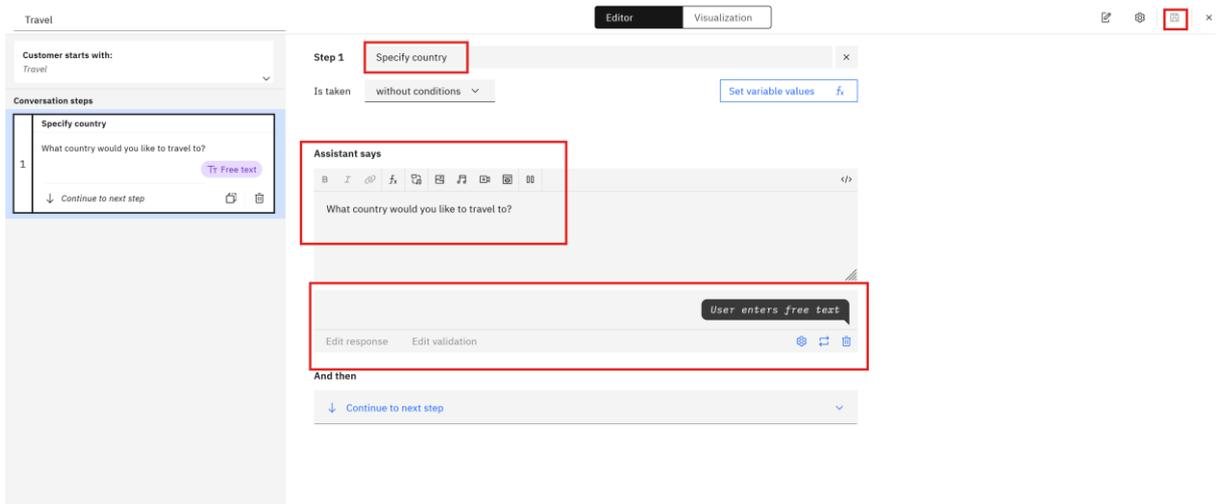


# 8. Create second conversation step

1.  Select **New step +** on the left pane. A new Step 2 will be created.

2.  Name the Step 2 as "Information on country". Select with conditions for the step. In the **Conditions**, click the first item, click "**Action step variables**" and select **1. Specify country**.

3. In the **Assistant says** text box, enter "Would you like information on $". A drop-down menu appears. Click "**Action step variables**" and select **1. Specify country**. Select the **Define customer response** drop down and select the **Confirmation** option.



4. Click save at the top right of the page and the step should look like below image.
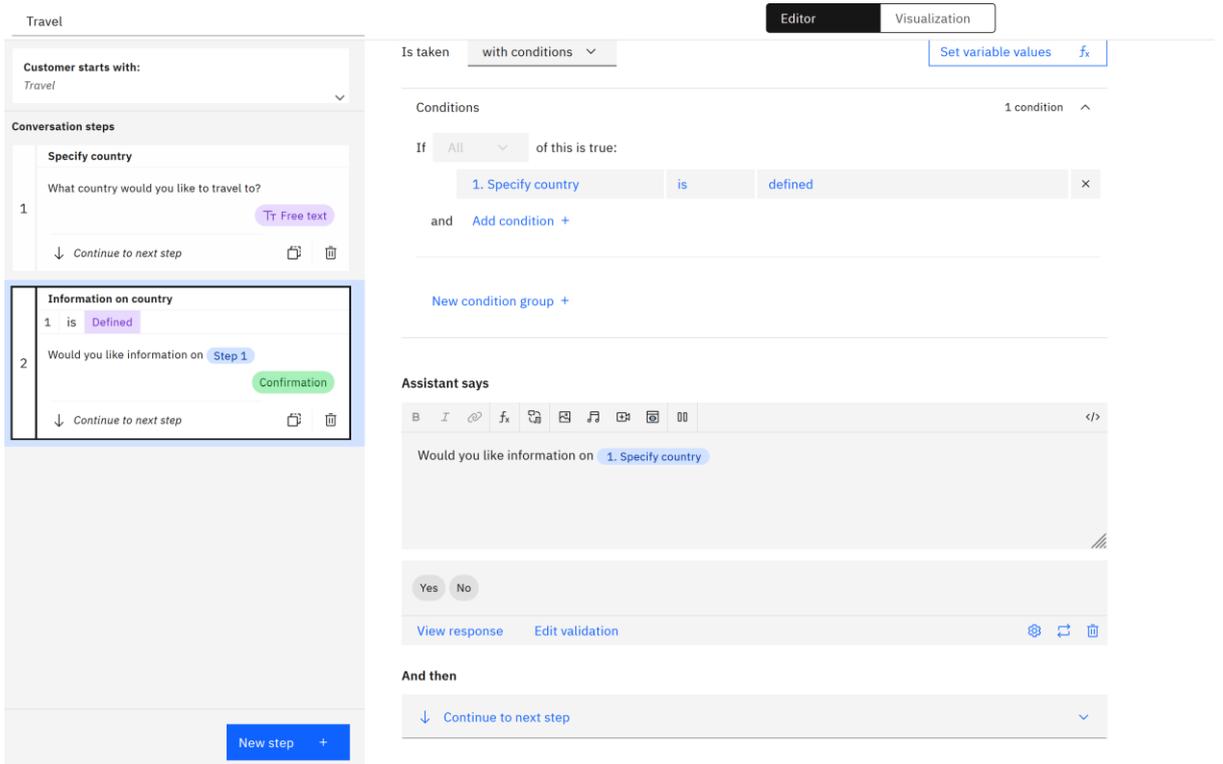
## 9. Create third conversation step

1. Select **New step +** on the left pane. Name the Step 3 as "No information on country required". Select **with conditions** for the step. In the Conditions, click the first item, click "**Action step variables**" and select **2. Information on country**. Click the third item and select **No**.

2. Expand **Continue to next step** under the **And then** section, and specify that the next step is **End the action**. When you click **End the action**, the UI shows **End the action** in the **And then** panel. This step means a user can end the dialogue flow if they don't want information on the country specified.

3. Click save at the top right of the page and the step should look like below image.
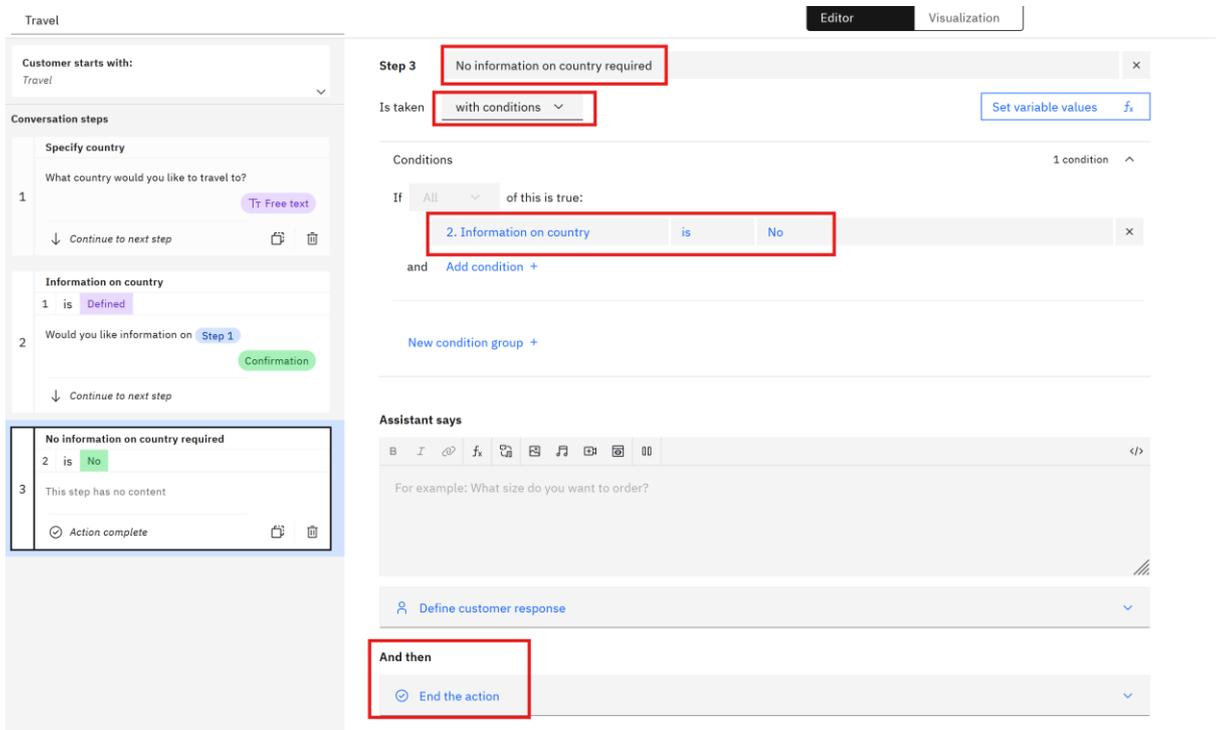


## 10. Create fourth conversation step

1. Select **New step +** on the left pane to create Step 4. Name the Step 4 as "Call LLM for general country information". Select **with conditions** for the step. In the Conditions, click the first item, click "**Action step variables**" and select **2. Information on country**. Click the third item and select **Yes**.

2. Select Set variable values button.



3. Select **Set new value +** under the variable values section. And select the **New session variable** option.



4. A session variable prompt will be displayed. Enter "**prompt**" for the **Name** field. Select **Choose a type** drop-down under the **Type** section and select the **Free text** option. Click **Apply**.



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5. For the variable assignment **To**, select **Expression**, and type **"Tell me about the country "** (with the double quotes), then enter "+" sign and next enter "$" sign. A drop-down menu appears. Click "**Action step variables**" and select **1. Specify country**. Click **Apply**.
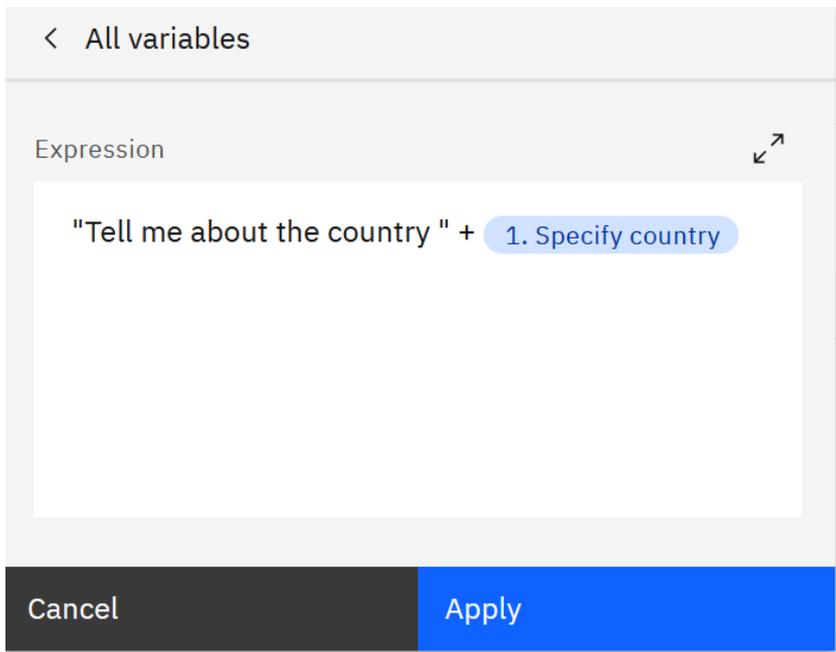


6. The variable value should look like below image.
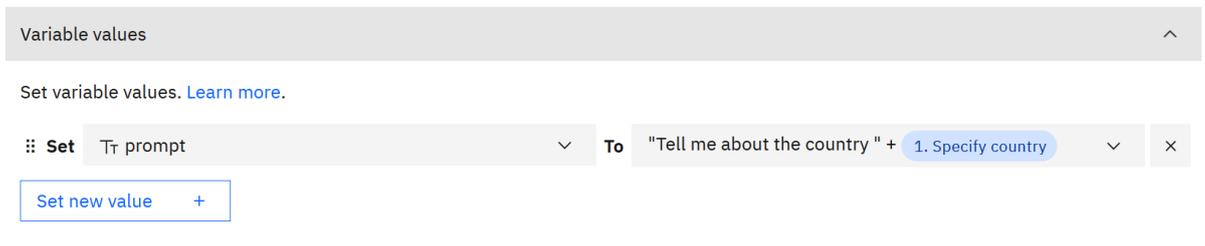


7. Under the **And then** section, select the **Continue to next step** drop-down and select **Use an extension** option.
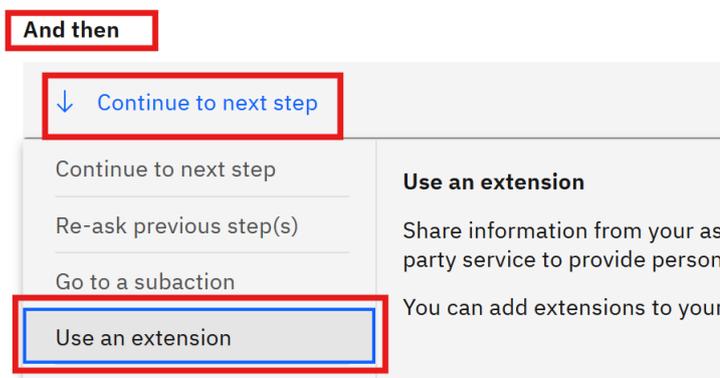


8. In the Extension setup, for the **Extension** field, select the **wa-ai-custom-extension** that you add created. For the **Operation** field, select **Generation** option. In the **Parameters** section, for version, choose **Enter text**, and then

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enter **2023-05-29**. For input, choose **Session Variables**, and then choose **prompt**. For the model_id, choose **Enter text**, enter **ibm/granite-13b-chat-v2**. For the project_id, choose **Enter text**, enter the watsonx.ai project ID that you had captured in  Step 2. Get your watsonx.ai project ID of this exercise. Don't click the **Apply** button yet.

Use an extension                                                                                           ✕
Extension setup
Choose an extension and operation. Then select the information to be shared with the external application to
respond to your users' needs. Learn more

Extension  ⓘ

wx-ai-custom-extension                                                                                     ⌄

Choose an extension that has been added to your assistant.

Operation  ⓘ

Generation                                                                                                 ⌄

Choose from a list of operations included in your extension.

Privacy  ⓘ
☐ Protect data returned from this extension

Parameters  ⓘ

| Set | T⊤ version | To | 2023-05-29 | ⌄ |
| Set | T⊤ input | To | T⊤ prompt | ⌄ |
| Set | T⊤ model_id | To | ibm/granite-13b-chat-v2 | ⌄ |
| Set | T⊤ project_id | To | 2befee5f-7274-4e51-a775&#9608;&#9608;&#9608;&#9608;51 | ⌄ |

9. Expand the **Optional parameters** drop-down. For this text generation scenario:

   a. Set parameters.temperature to **0.7**

   b. Set parameters.max_net tokens to **900**

   c. Set parameters.min_new_tokens to **50**

   d. Set parameters.repetition penalty to **2**

   e. Set parameters.decoding_method to **sample**

   f. Click **Apply**.

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10. Click **save** at the top right of the page. Finally, the Step 4 should look like below image.

# 11. Create fifth conversation step

1. Select **New step +** on the left pane to create Step 5. Name the Step 5 as "Country info response". Select **with conditions** for the step. In the Conditions, click the first item, select **wx-ai-custom-extension (step 4)** and select **Ran successfully**.

| Step 5 | Country info response | | ✕ |
|---|---|---|---|

Is taken [ with conditions ▾ ]　　　　　　　　　Set variable values  *f*ₓ

Conditions　　　　　　　　　　　　　　　　　　　1 condition  ⌃

If [ All  ▾ ] of this is true:

| 4 ⧉ Ran successfully | == | true | | ✕ |
|---|---|---|---|---|

and　Add condition +

2. Select **Set variable values** button. Select **Set new value +** under the variable values section. And select the **New session variable** option.

3. A session variable prompt will be displayed. Enter "**result country info**" for the **Name** field. Select **Choose a type** drop-down under the **Type** section and select the **Free text** option. Click **Apply**.

Session variable　　　　　　　　　　　　　　✕

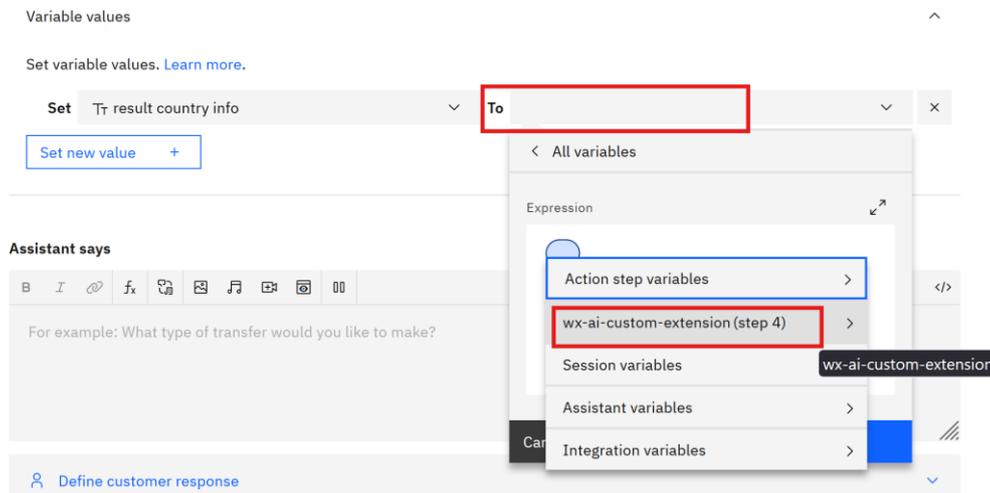Name　　　　　　　　　　　Variable ID ⓘ

[ result country info ]　　[ result_country_info      ⧉ ]

Type

[ T⊤ Free text                                        ▾ ]

Initial value (optional) ⓘ　　　　　　　　　◯ Use expression

[                                                          ]

Description (optional)

[                                                          ]
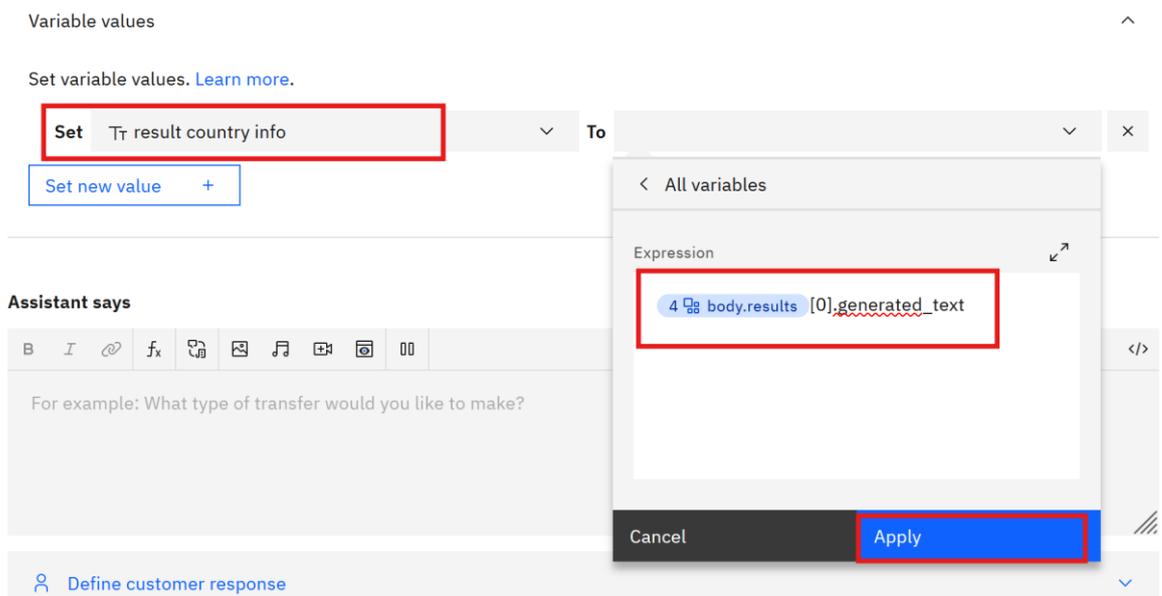
Privacy ⓘ
☐ Protect data stored in this variable

Cancel　　　　　　　　[ **Apply** ]

4. For the variable assignment **To**, select **Expression**, and type "$". A drop-down menu appears. Select **wx-ai-custom-extension (step 4)**.

5. Next select **body.results** option**.** The box fills in with the assignment for the **result_country_info** variable**.** Now append **"**[0].generated_text" to the expression. Click **Apply**.



6. The full expression for the variable should be displayed, as shown in the following image.
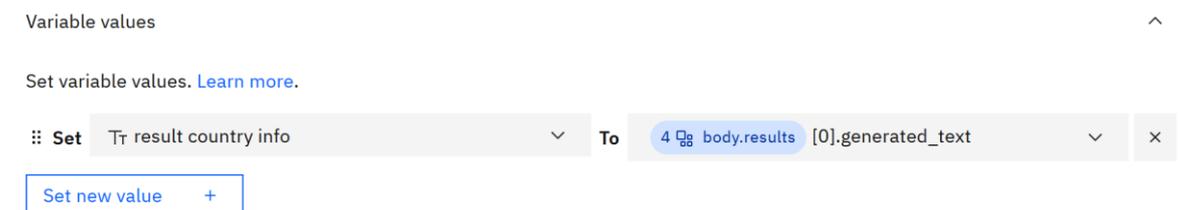


7. In the **Assistant says** panel, select **function**, and then enter "${result_country_info}". Or you can select **Session variables**, and then **result_country_info**. This panel will display the information to the assistant user as returned by the LLM when inferenced. It uses the **result_country_info** variable to store the result from the LLM.
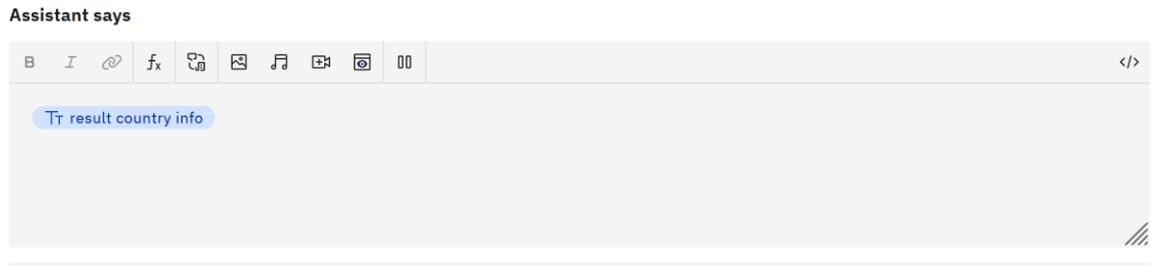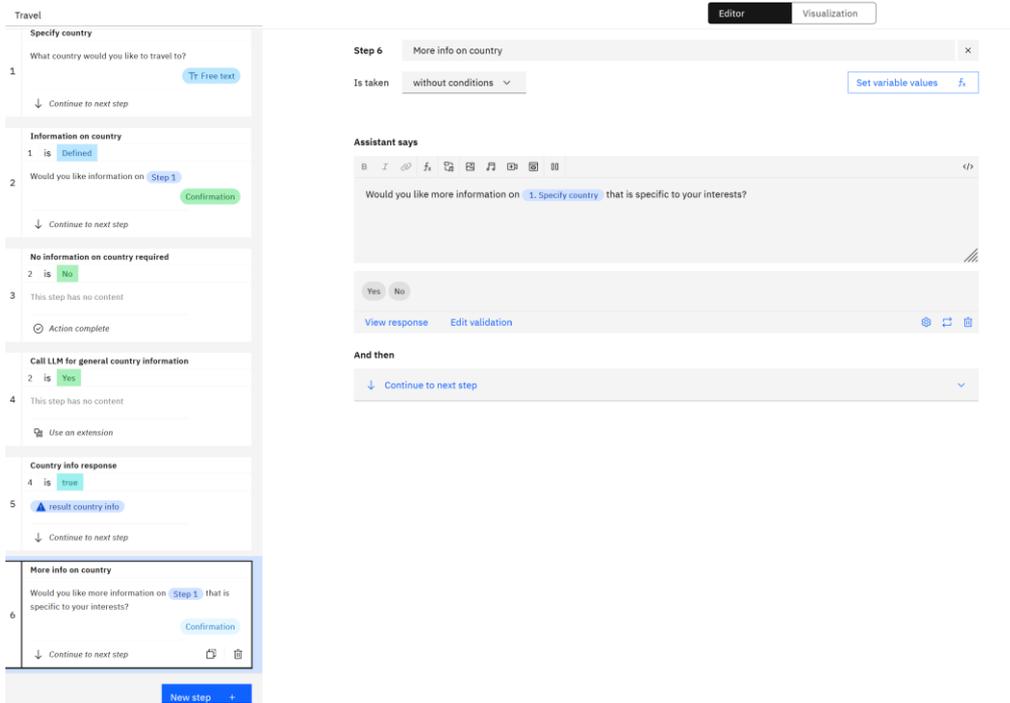
8.  Click **Save** at the top right of the page and the Step 5 should look like below image.
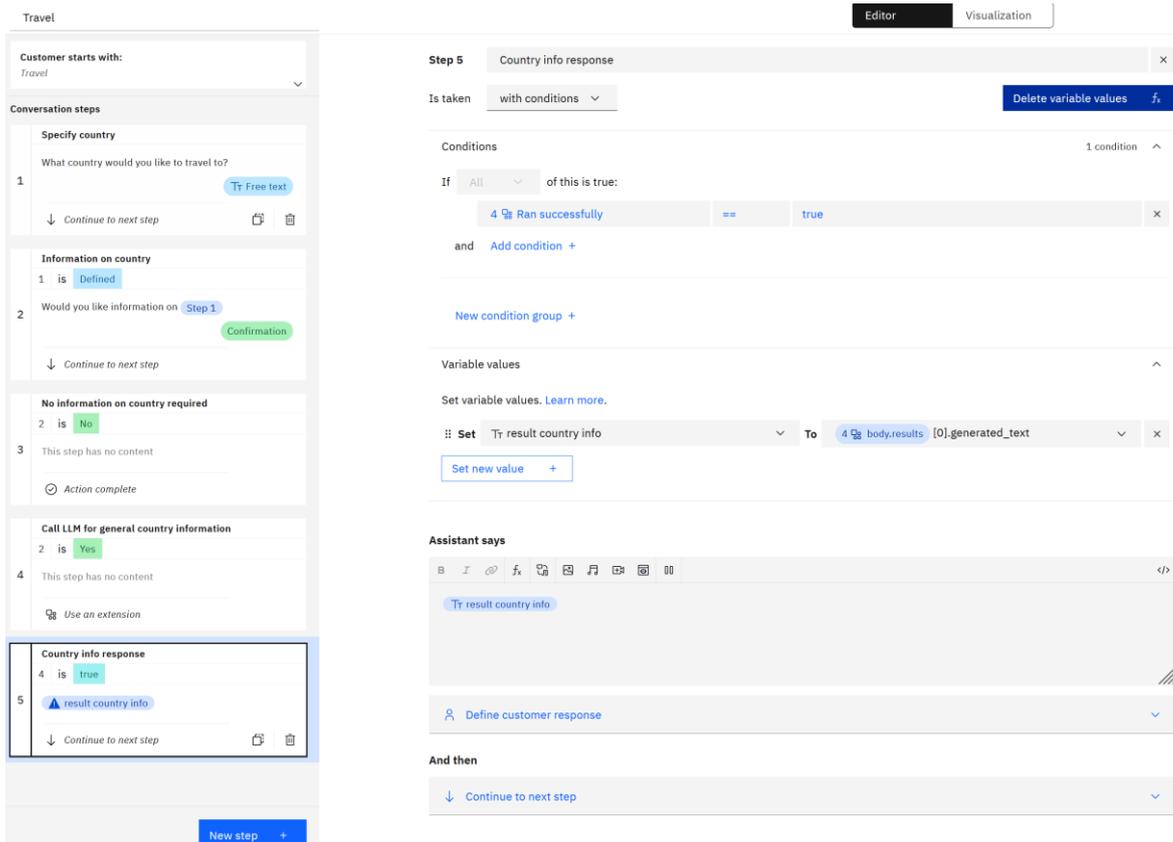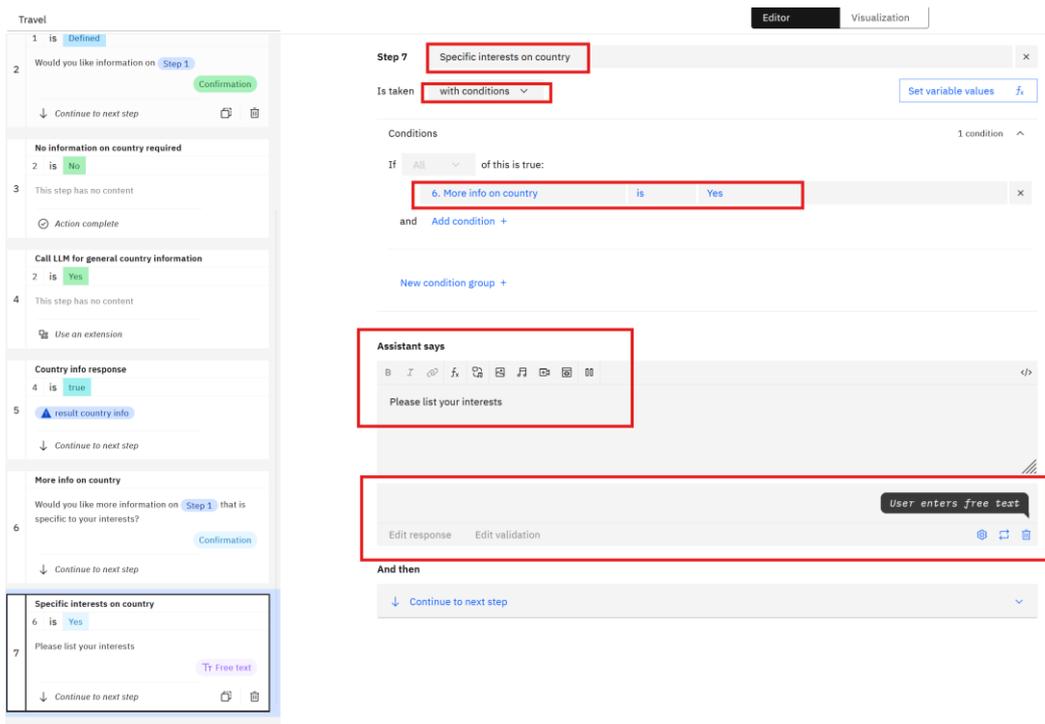


## 12.  Create sixth conversation step

1.  Select **New step +** on the left pane to create Step 6. Name the Step 5 as "More info on country". In the **Assistant says,** add text "Would you like more information on" and add "$". A drop-down menu appears. Click "**Action step variables**" and select **1. Specify country**. Next, append text "that is specific to your interests?". In **Define customer response**, select **Confirmation** option.

2.  Click **Save** on the top right of the page and Step 6 should like below image.

## 13.  Create seventh conversation step

1.  Select **New step +** on the left pane to create Step 7. Name the Step 7 as "Specific interests on country". In this step, select **with conditions**. In the condition, click the first item, click "**Action step variables**" and select **6. More info on country**. Click the third item and select **Yes**. In the **Assistant says**, add text "Please list your interests". In **Define customer response**, select **Free Text** option.

2.  Click **Save** on the top right of the page and Step 7 should like below image.

## 14. Create eighth conversation step

1. Select **New step +** on the left pane to create Step 8. Name the Step 8 as "No specific interests on country". In this step, select **with conditions**. In the condition, click the first item, click "**Action step variables**" and select **6. More info on country**. Click the third item and select **No**. In the **And then** section, select **End the action** option.

2. Click **Save** on the top right of the page and Step 8 should like below image.
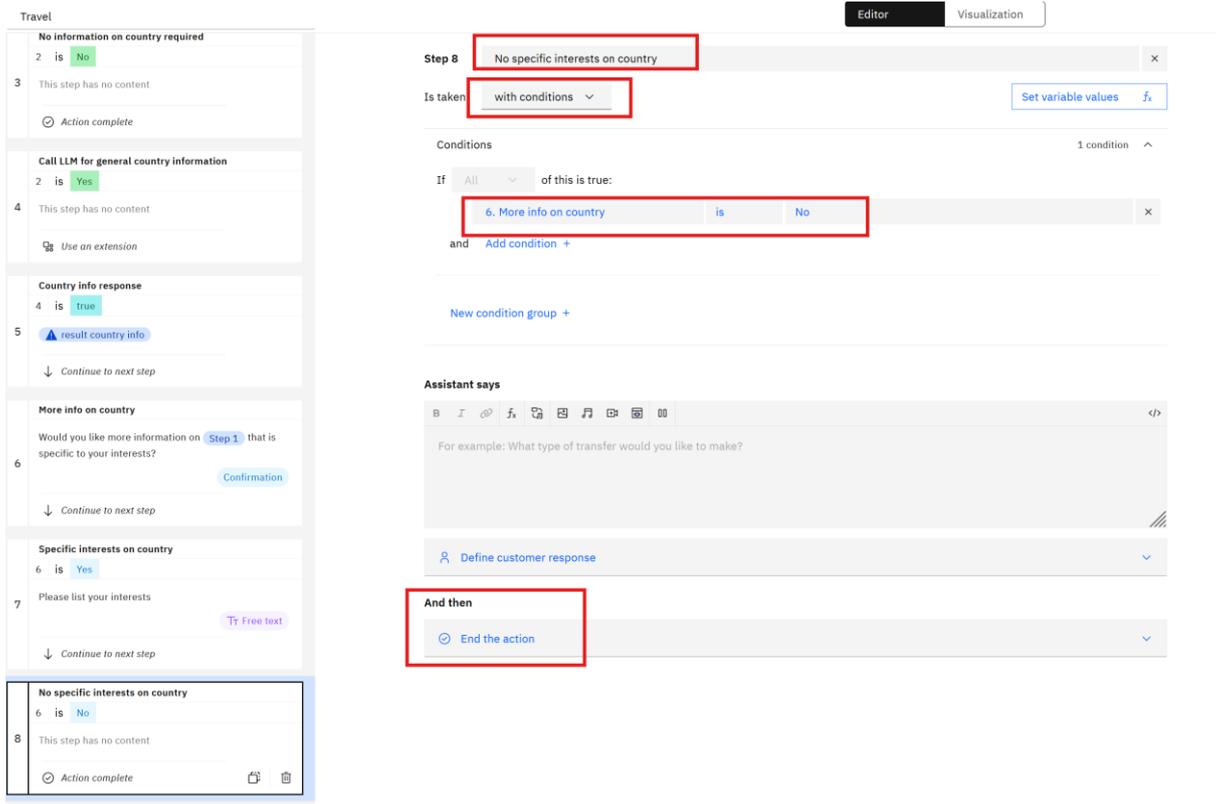


## 15. Create ninth conversation step

1. Select **New step +** on the left pane to create Step 9. Name the Step 9 as "Call LLM for specific country information". In this step, select **with conditions**. In the condition, click the first item, click "**Action step variables**" and select **7. Specific interests on country**.



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2.  Select **Set variable values** button. Select **Set new value +** under the Variable values section and select the **New session variable** option.

3.  A session variable prompt will be displayed. Enter "**prompt specific**" for the **Name** field. Select **Choose a type** drop-down under the **Type** section and select the **Free text** option. Click **Apply**.



4.  For the variable assignment **To**, select **Expression**, and following previous variable assignment steps instructions, enter the text as shown in the below image.



5.  In the **And then** section, select **Use an extension** option.

6.  In the Extension setup, for the **Extension** field, select the **wa-ai-custom-extension** that you add created. For the **Operation** field, select **Generation** option. In the **Parameters** section, for version, choose **Enter text**, and then enter **2023-05-29**. For input, choose **Session Variables**, and then

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choose **prompt_specific**. For the model_id, choose **Enter text**, enter **ibm/granite-13b-chat-v2**. For the project_id, choose **Enter text**, enter the watsonx.ai project ID that you had captured in Step 2. Get your watsonx.ai project ID of this exercise. Don't click the **Apply** button yet.

Use an extension      ✕

## Extension setup

Choose an extension and operation. Then select the information to be shared with the external application to respond to your users' needs. Learn more

Extension ⓘ

| wx-ai-custom-extension | ˅ |
|---|---|

Choose an extension that has been added to your assistant.

Operation ⓘ

| Generation | ˅ |
|---|---|

Choose from a list of operations included in your extension.

Privacy ⓘ
☐ Protect data returned from this extension

Parameters ⓘ

| Set | T version | To | 2023-05-29 | ˅ |
|---|---|---|---|---|
| Set | T input | To | T prompt specific | ˅ |
| Set | T model_id | To | ibm/granite-13b-chat-v2 | ˅ |
| Set | T project_id | To | 2befee5f-7274-4e51-███████████1 | ˅ |

Optional parameters        ˅

| Cancel | Apply |
|---|---|

7. Expand the **Optional parameters** drop-down. For this text generation scenario:

    a. Set parameters.temperature to **0.7**

    b. Set parameters.max_net tokens to **900**

    c. Set parameters.min_new_tokens to **50**

    d. Set parameters.repetition penalty to **2**

    e. Set parameters.decoding_method to **sample**

    f. Click **Apply**.

8. Click Save on the top right of the page and Step 9 should look like below image.

# 16. Create tenth conversation step

1. Select **New step +** on the left pane to create Step 10. Name the Step 10 as "Specific country info response". Select **with conditions** for the step. In the Conditions, click the first item, select **wx-ai-custom-extension (step 9)** and select **Ran successfully**.

| Step 10 | Specific country info response | | × |
|---|---|---|---|
| Is taken | with conditions ∨ | | Delete variable values   *f*ₓ |

Conditions                                                                 1 condition  ∧

If   All  ∨   of this is true:

| 9 ⊞ Ran successfully | == | true | | × |
|---|---|---|---|---|

and   Add condition  +

2. Select **Set variable values** button, select the **Set new value +** button and select the **New session variable** option. A session variable prompt will be displayed. Enter "**result country specific info**" for the **Name** field. Select **Choose a type** drop-down under the **Type** section and select the **Free text** option. Click **Apply**.

Session variable                                                                      ×
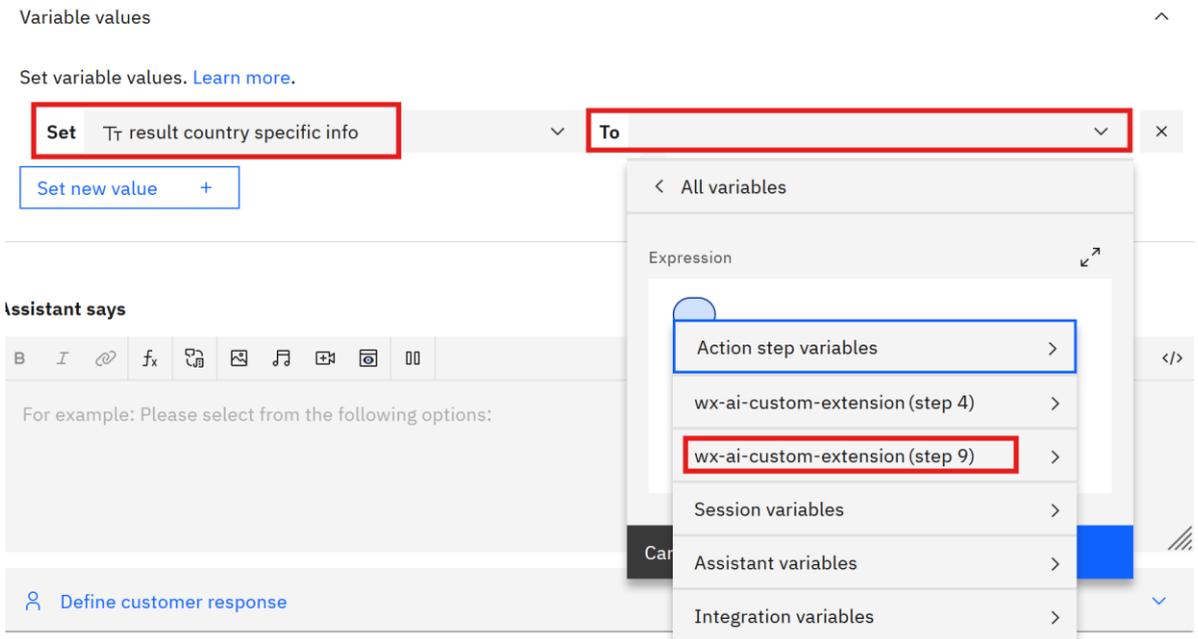
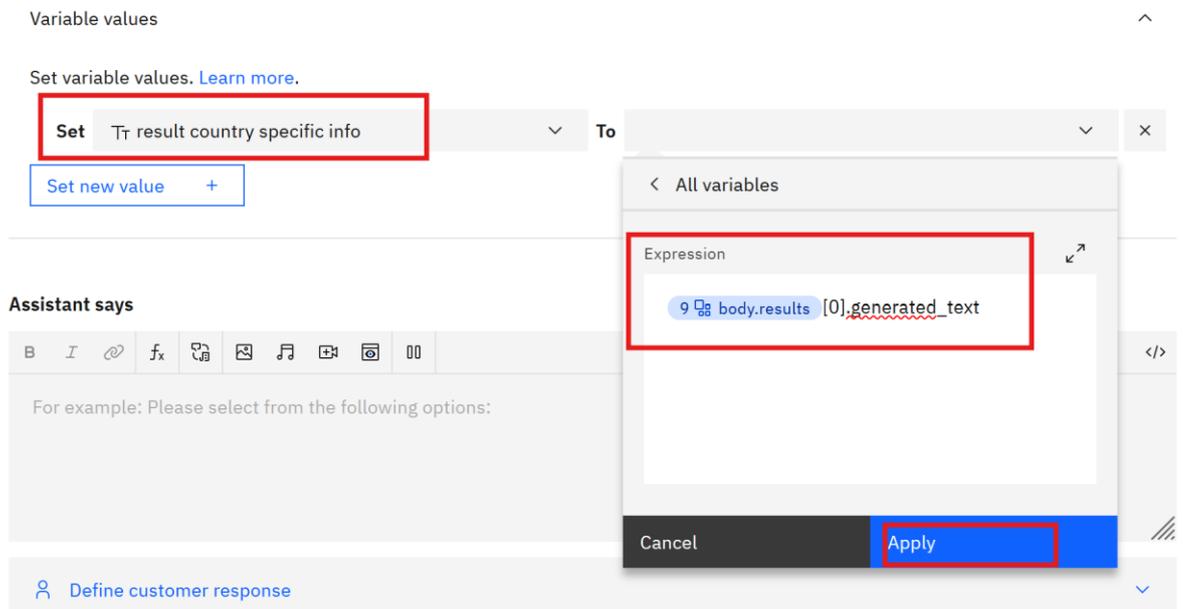Name                                      Variable ID ⓘ

result country specific info              result_country_specific_info     ⧉

Type

Tᴛ Free text                                                                         ∨

Initial value (optional) ⓘ                                     ⬤  Use expression

Description (optional)

Privacy ⓘ
☐ Protect data stored in this variable

| Cancel | Apply |
|---|---|

3. For the variable assignment **To**, select **Expression**, and type "$". A drop-down menu appears. Select **wx-ai-custom-extension (step 9)**.

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4. Next select **body.results** option**.** The box fills in with the assignment for the **result_country_info** variable**.** Now append **"**[0].generated_text" to the expression. Click **Apply**.



5. The full expression for the variable should be displayed, as shown in the following image.



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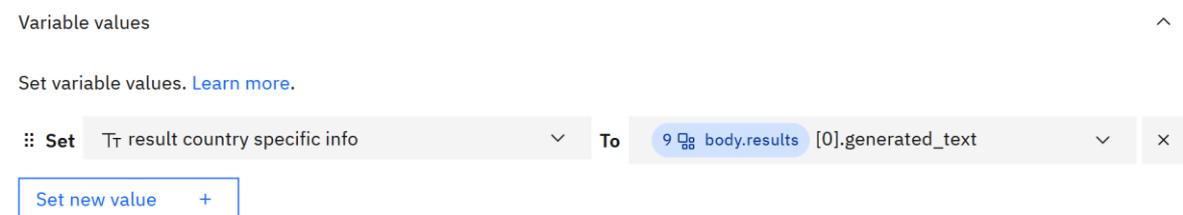
6. In the Assistant says panel, select function, select Session variables, and then result_country_specific_info.
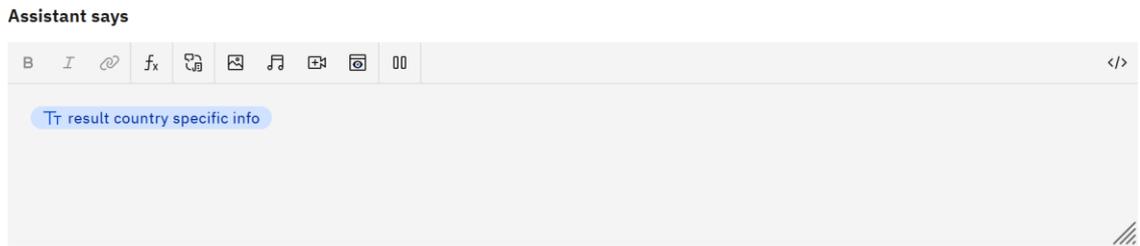


7. In the **And then** section, select **End the action** option.

8. Click **Save** at the top right of the page and the Step 5 should look like below image.
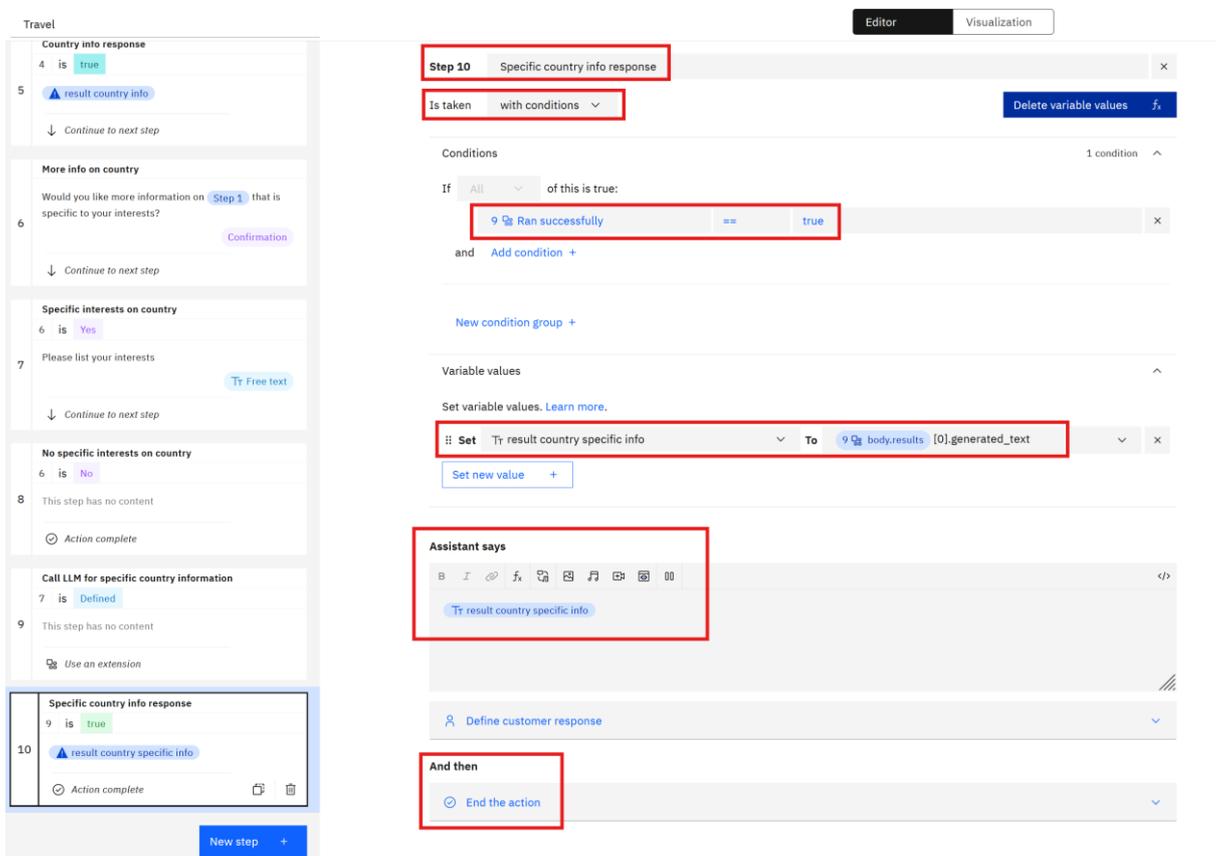


## 17. Test the travel assistant

1. Now, let's test the travel assistant action. Select **Preview** on the bottom right corner of the screen. You can restart the conversation and start fresh by selecting **Restart conversation arrow** at the top of the Preview.

2. Enter "travel" in the Preview chat field. You can notice the assistant provides the right response asking which country to travel. Enter "Greece" in the chat field. Now it responds asking if you want info about Greece.

watsonx.ai integration to enable Gen AI
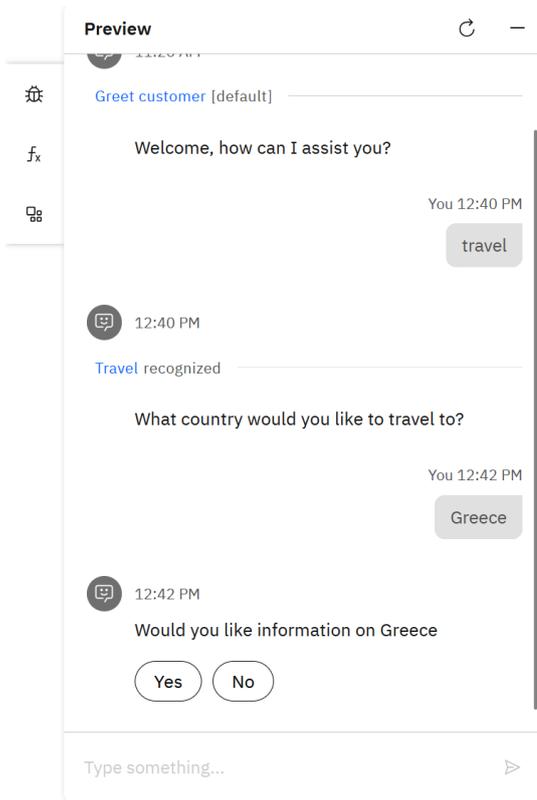
3. Click **Yes** and if everything worked, you should receive a response from the model containing the info on the country you specified. In the response, you will see something different if you rerun for the same country because you are using a sampling (versus greedy) decoding approach.



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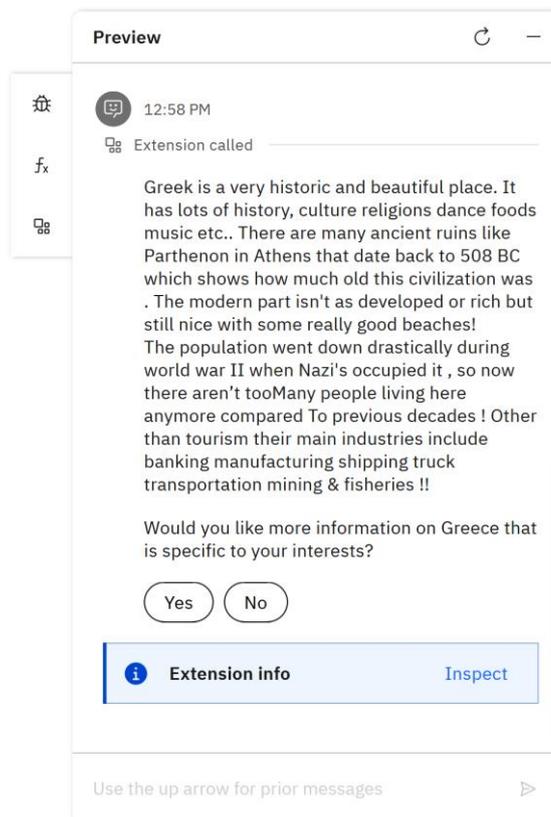
4. If you click **Yes** for information more specific to your interests, then you will be prompted to enter your interests. Enter some interests like "water sports and food". Once interests are entered, if everything worked, you should receive a response from the model with more specific info on the country.
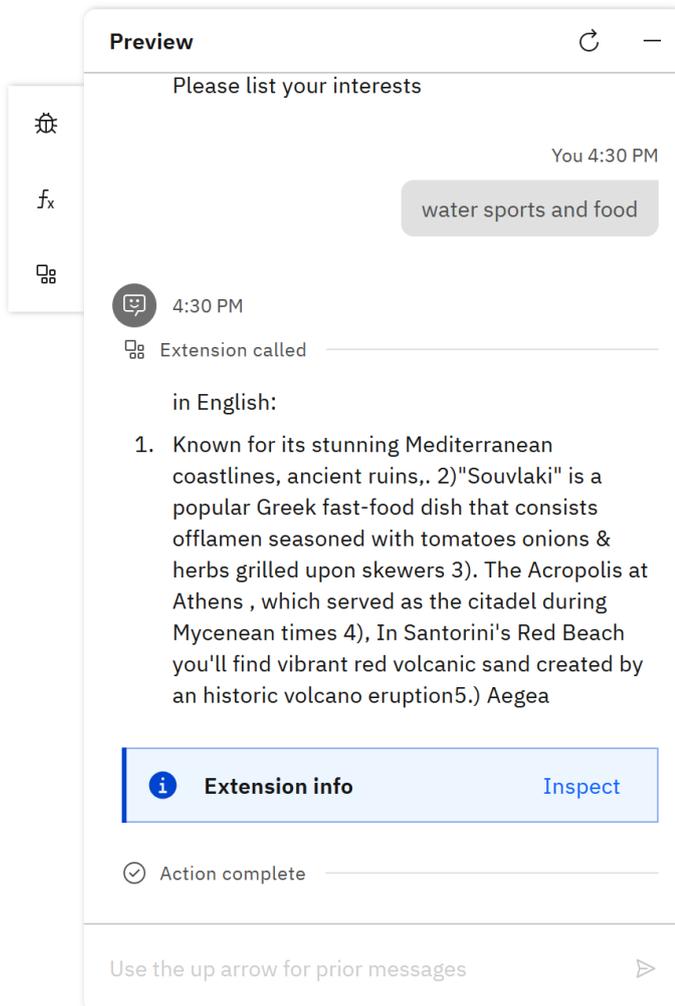


## 18. Next steps

1. Experiment and try:

    a. Use different AI models available on watsonx.ai platform to see the different responses generated by the models. You can refer to [Foundational model IDs documentation](#) to get the list of all supported AI models on the watsonx.ai platform.

    b. Change the model parameters to fine tune the model responses. You can refer to [Foundational model parameters documentation](#) to learn how to adjust the model parameters.

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