



## The watsonx Bootcamp for IT Automation – Build a Chatbot That Can Help You Optimize Performance [3488]

**Create an IT Operations virtual assistant with watsonx Assistant and Turbonomic**

### **Your challenge scenario**

You are an infrastructure operations lead. You are under pressure from the CIO to reduce costs. You are under pressure from the business to deliver reliable performing application infrastructure. And now you have onboarded a new class of IT operators and need them to be effective immediately.

It would help if you had a natural language interface to return your top priority actions from your application performance management platform, Turbonomic.

In this challenge, you will:

- Walk through Turbonomic to identify “No Brainers Actions” for experienced users
- Create a chat interface to accomplish the same through natural language for a new user

The participant that successfully completes submission 1 & 2 (includes identifying the highest saving and % of entities in each health categories) will be the winner. In the case of a tie for highest savings, the winner will be determined by earliest submission timestamp.

Here are quick videos to help you understand Turbonomic and Watson Assistant:

- [Turbonomic in 2 mins](#)
- [Turbonomic value in 2 mins](#)
- [watsonx Assistant in 2 mins](#)

### **Walk through the Turbonomic interface to identify no-brainer actions**

**Turbonomic actions:** Turbonomic, after it is deployed, immediately starts its analysis of your environment. This holistic analysis identifies problems and the actions you can take to *resolve* and *avoid* these problems. Turbonomic then generates a set of actions for that particular analysis and displays it in Action Center for you to investigate.

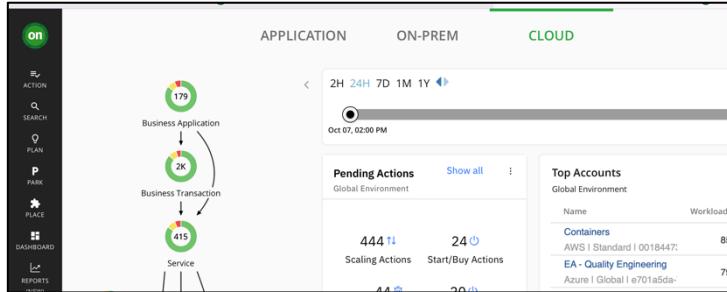


Action Center (1112) <span style="color: #0070C0;">i</span>							
VC7DC1/VC7DCC6							
ALL (1,112)		ON-PREM (78)	CLOUD (967)				
<b>RESIZE</b>	<span style="font-size: 1.5em;">^</span>	<b>Resize Actions (58)</b>	VMEM Reclaim 46 GB	VCPU Reclaim 20 vCPU		<b>EXECUTE ACTIONS</b>	  
Virtual Machines (58)		<input type="text"/> Type to search					
<b>MOVE</b>	<span style="font-size: 1.5em;">^</span>						
Virtual Machines (24)		<input type="checkbox"/> Virtual Machine Name	Risk	Resize Direction	Current Value	New Value	Resize Attribute
		<input type="checkbox"/> System_Test	Virtual Memory	Upsize	2 GB	3 GB	Capacity
<b>SUSPEND</b>	<span style="font-size: 1.5em;">^</span>	<input type="checkbox"/> qe-ocp412-n79zz-worker-v4bkp	Virtual CPU	Upsize	4 vCPU	8 vCPU	Capacity
Hosts (3)		<input type="checkbox"/> qe-ocp412-n79zz-worker-v4bkp	Virtual Memory	Upsize	16 GB	18 GB	Capacity
		<input type="checkbox"/> qe-ocp412-n79zz-worker-hzktq	Virtual Memory	Upsize	16 GB	18 GB	Capacity
		<input type="checkbox"/> ocp412.turbo.rtp	Virtual Memory	Upsize	16 GB	18 GB	Capacity

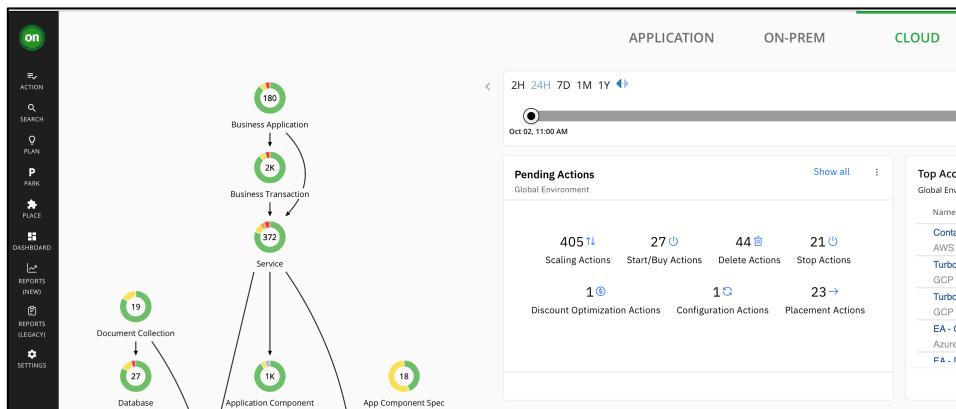
**No Brainer Actions:** Turbonomic actions that are non-disruptive to your IT environment performance and still maximize cost savings

Follow the steps below to identify the ‘No Brainer Actions’ in the provided Turbonomic environment above.

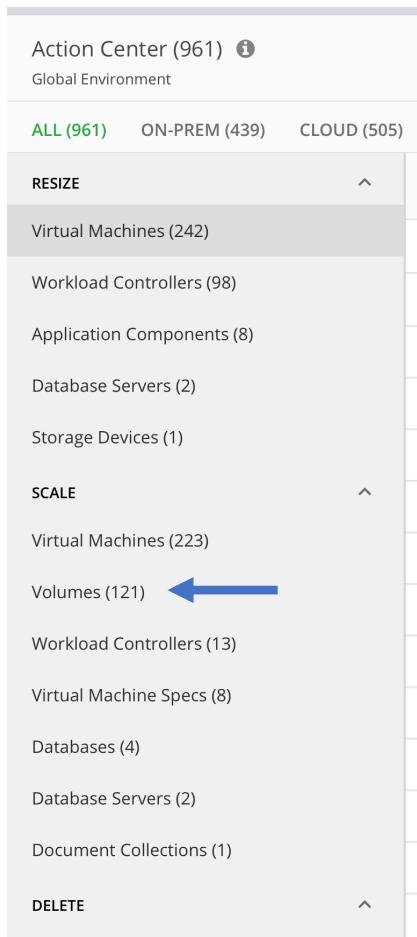
1. Access the Turbonomic instance - <https://workshop.demo.turbonomic.com/>
    - username: watsonx\_student
    - password: watsonx2024
  2. On the main dashboard, go to the **Cloud** tab.



3. Locate the Pending Actions widget, and click **Show All**.



- On the left, in the **Scale** category, click on **Volumes**.



- On the **AWS** tab, in the top-right corner, click on **Add Filter**.
- Scroll down in the list and select **Non Disruptive**.

The screenshot shows the AWS tab of the Turbonomic interface with the following details:

Scale Actions (54)										TOTAL SAVINGS \$259.48/mo	TOTAL INVESTMENTS \$35.92/mo	EXECUTE ACTIONS	Search Filter		
<input type="checkbox"/>	Name	Account	Non-Disrupt...	Reversi...	Attached VM	Tier	Disk Size	IOPS	Cost	New Tier	New Cost	New Tier	Non Disruptive	Reversible	Risk
<input type="checkbox"/>	vol-09da43b39f1	Containers	✓	✓	i-0078c28edc	GP2	20 GB	100	\$0.003/h	GP3					
<input type="checkbox"/>	vol-0c71641340f	Containers	✓	✓	i-0b0f445827	GP2	20 GB	100	\$0.003/h	GP3					
<input type="checkbox"/>	vol-0c02d6369ef	Containers	✓	✓	i-0137f42258	GP2	20 GB	100	\$0.003/h	GP3					
<input type="checkbox"/>	ae-test-q4hqn-w	Containers	✓	✓	ae-test-q4hqr	GP3	300 GB	3000	\$0.033/h	GP3					

- Set **Equals** and **Yes**, and click **Apply**.
- Click on **Add Filter** again.
- Select Action Category. Set Equals and Performance, and click Apply.

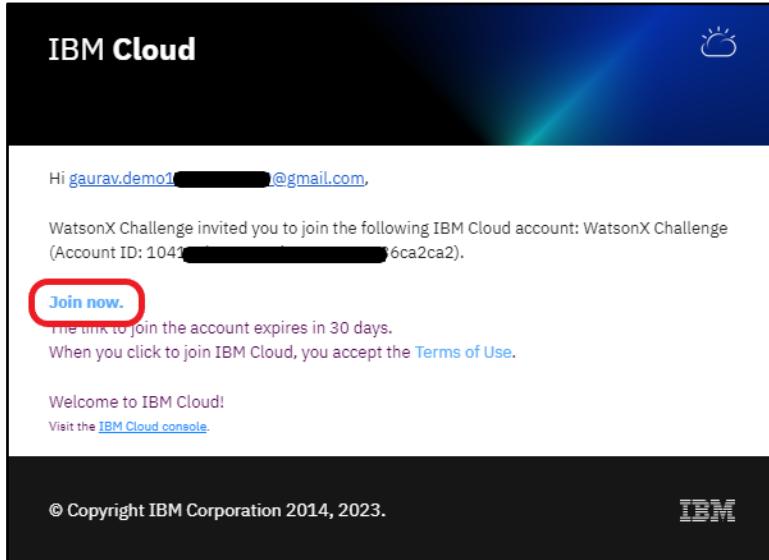
The screenshot shows a list of actions in a table format. The columns include Attached VM, Tier, Capacity, Utilization, Cost/h, and Resource Impact and Cost Impact. A modal dialog titled "Filter by Action Category" is open, showing dropdown menus for "equals" and "Performance". Buttons for "CANCEL" and "APPLY" are at the bottom of the dialog. The background table has two rows visible.

Attached VM	Tier	Capacity	Utilization	Cost/h	Resource Impact and Cost Impact
-0078c28ed2	GP2	20 GB	100	\$0.003/h	GP3
-0b0f445827	GP2	20 GB	3000	\$0.002/h	

10. Click on the **Cost Impact** column to sort by the savings per month delivered by taking the actions. All actions that show a cost savings (down arrow) are “no brainers,” i.e. they:
  - address a performance risk / resource congestion
  - save money and are non-disruptive to execute
11. Click on the **Details** for one of the actions.
12. In the pop screen you are presented with the **Action Details** page that provides a comprehensive set of information to help you understand why Turbonomic recommend the action and the impact it will have.
13. Review the page and take a screen shot of the **Resource Impact and Cost Impact**.

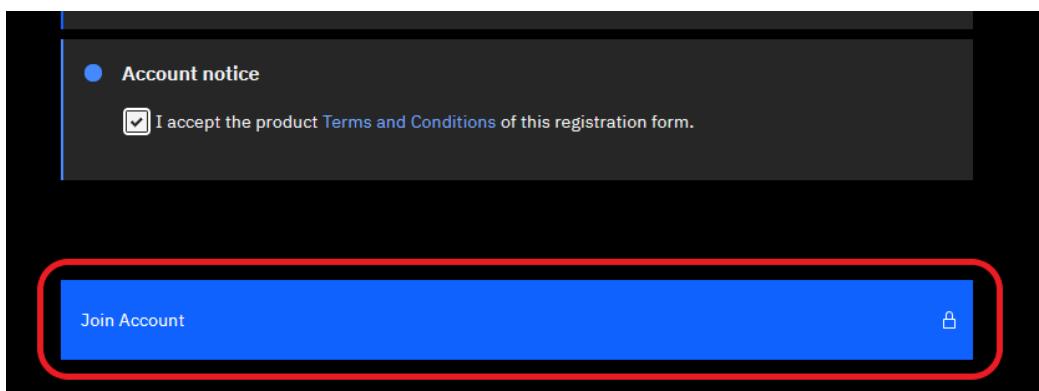
## Access your IBM Cloud account

1. Open the email you received from the IBM Cloud team about joining your cloud account.\*
2. Click the **Join Now** button seen in that email.

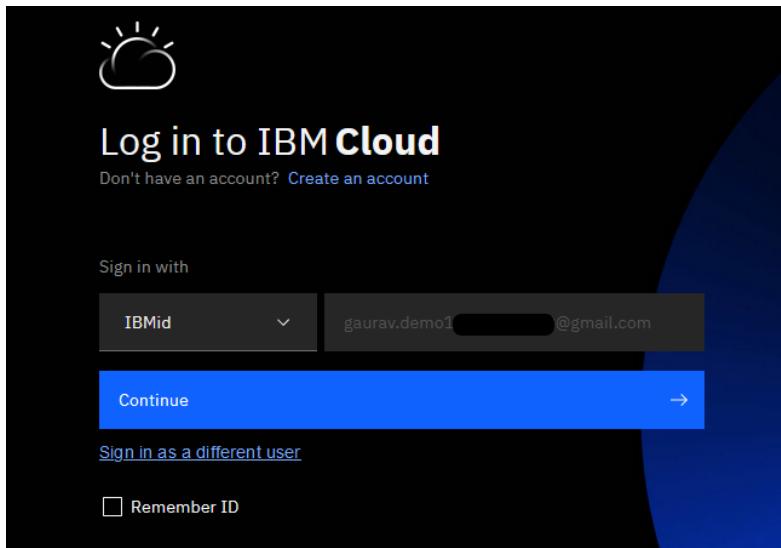


\* You should have received an email invitation from the IBM Cloud team. Please check your junk/spam folders if you are not able to find the email in your inbox. You can also do a quick search for “IBM Cloud” in your inbox to quickly find the email. If you did not receive an email, please let the mentors know and they can help you.

3. A new browser tab will open with the cloud account sign up page. Read and accept the terms and conditions and click the **Join Account** button.

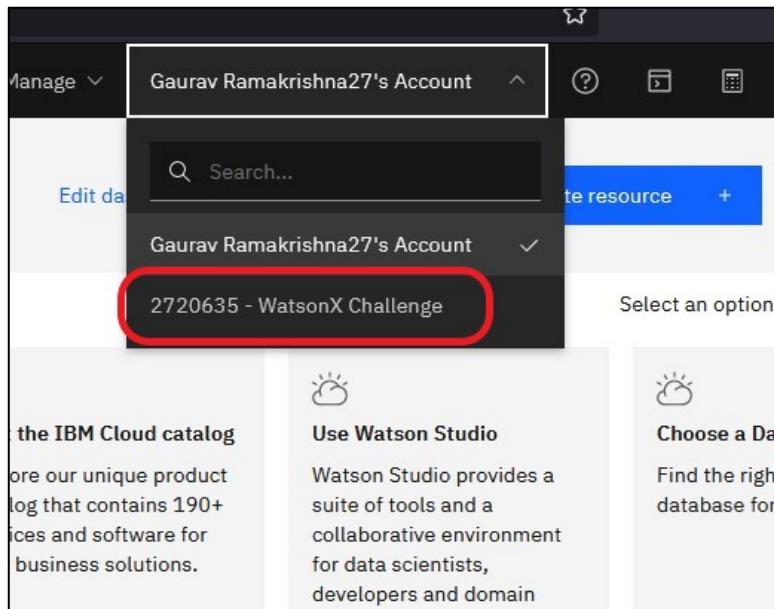


4. Complete the authentication process by clicking the **Continue** button.



After you authenticate successfully, you will be taken to the IBM Cloud dashboard.

**Note:** If you have an existing IBM Cloud account, you will be directed to your existing account by default. In this case, please switch your account to the **xxxxxxxx-WatsonX Challenge** or **xxxxxxxx-WatsonX Ecosystem Challenge** cloud account.



## Configure the watsonX Assistant service

1. From the main IBM Cloud dashboard (<https://cloud.ibm.com/>), select the **Resource list** hamburger menu on the left pane. Expand the **AI/Machine Learning** section and select the pre-provisioned **watsonx-Challenge WA** watsonx Assistant service.

**Note:** To navigate to the main dashboard, you can either click IBM Cloud on the top-left of the screen or enter the URL <https://cloud.ibm.com/resources> in your browser.

The screenshot shows the IBM Cloud Resource list interface. On the left, there's a sidebar with various icons for different service categories like Compute, Containers, Networking, Storage, Converged Infrastructure, Enterprise applications, and AI/Machine Learning. A red circle highlights the 'AI / Machine Learning' icon. Below the sidebar is a table titled 'Resource list' with columns: Name, Group, Location, Product, and Status. The table lists three services under 'AI / Machine Learning': 'watsonx-Challenge WA' (selected), 'watsonx-Challenge WML', and 'watsonx-Challenge WS'. All three services are marked as 'Active'.

2. You will be taken to the watsonx Assistant service dashboard. Click the **Launch watsonx** Assistant button.

The screenshot shows the watsonx-Challenge WA service dashboard. At the top, it displays the service name 'watsonx-Challenge WA', its status as 'Active', and a 'Add tags' button. Below this is a 'Manage' section with 'Service credentials' and 'Plan' options. The main area is titled 'Start by launching the tool' and features a prominent blue 'Launch watsonx Assistant' button, which is also highlighted with a red box. To the right of this button is a 'Getting started tutorial' link. Further down, there's a 'Credentials' section with fields for 'API key' (containing a redacted string) and 'URL' (containing the URL <https://api.jp-tok.assistant.watson.cloud.ibm.com/instances/ec58ba4e>). There are also 'Download' and 'API' links at the bottom of this section.

3. Please enter a name (example: *My First Ops Assistant*) and description (optional) for your first assistant and set the language to English. Then click the **Next** button.

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Welcome to watsonx Assistant

Create    Personalize    Customize    Preview

**Create your first assistant**

Let's get your assistant up and running. Name your assistant, add a description, and choose a language. In following steps we'll gather more information, show you basic customizations, and give you a preview of what your assistant will look like.

Assistant name  
My First Ops Assistant

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

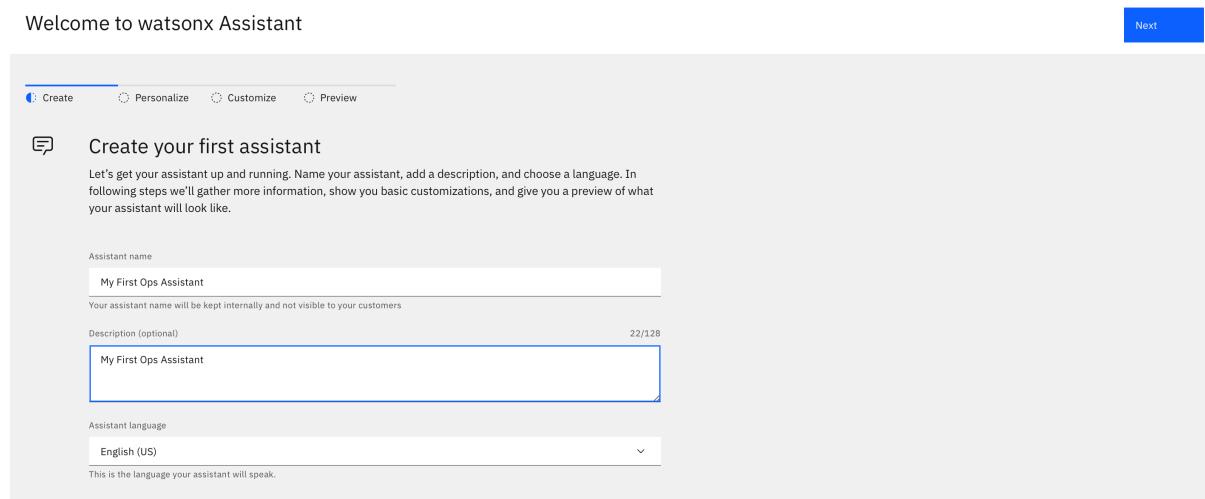
Description (optional)  
My First Ops Assistant

22/128

Assistant language  
English (US)

This is the language your assistant will speak.

**Next**



4. Personalize the assistant by filling in the details as per the below screenshot and click the **Next** button.

Welcome to watsonx Assistant

Create    Personalize    Customize    Preview

**Personalize your assistant**

**Tell us where your assistant will live**  
You may add multiple channels from your dashboard.

Where do you plan on deploying your assistant?  
I'm not sure

No problem! Let's get you started with web chat.

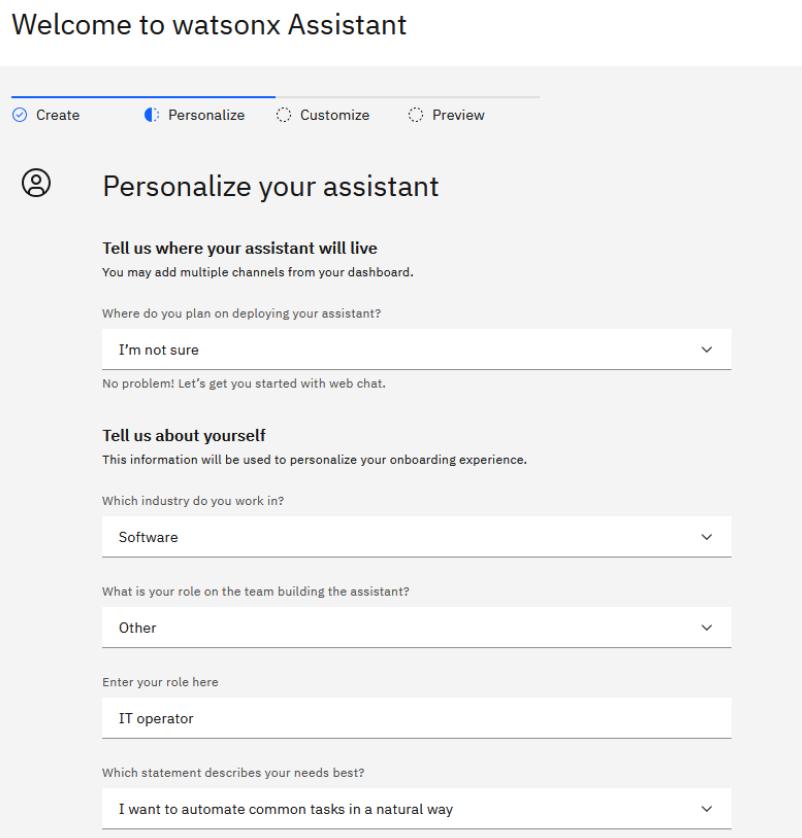
**Tell us about yourself**  
This information will be used to personalize your onboarding experience.

Which industry do you work in?  
Software

What is your role on the team building the assistant?  
Other

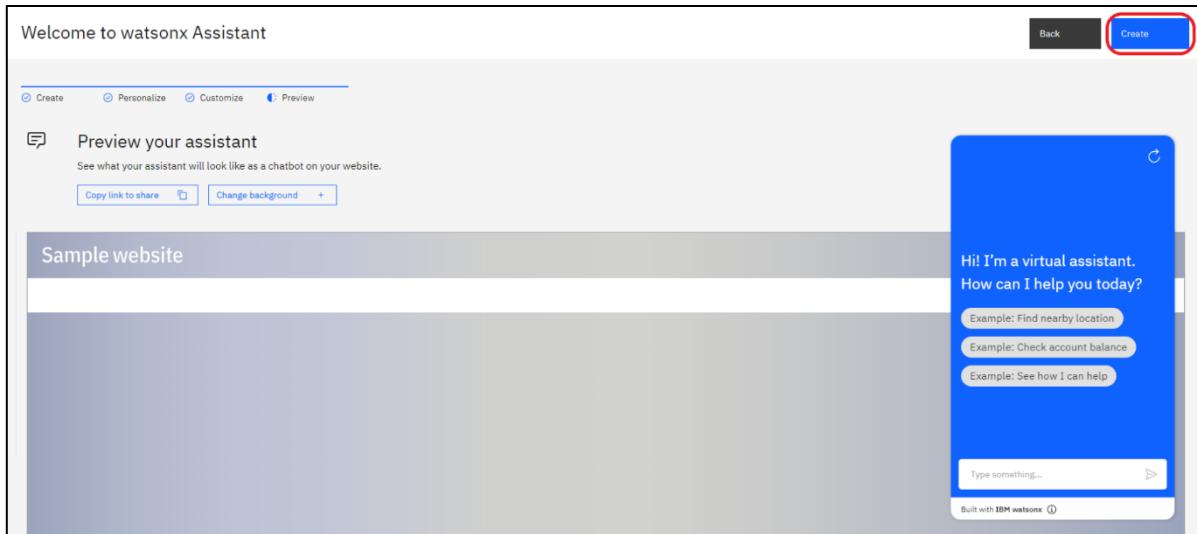
Enter your role here  
IT operator

Which statement describes your needs best?  
I want to automate common tasks in a natural way



5. Customize your chat UI with colors and an avatar image and click the **Next** button.

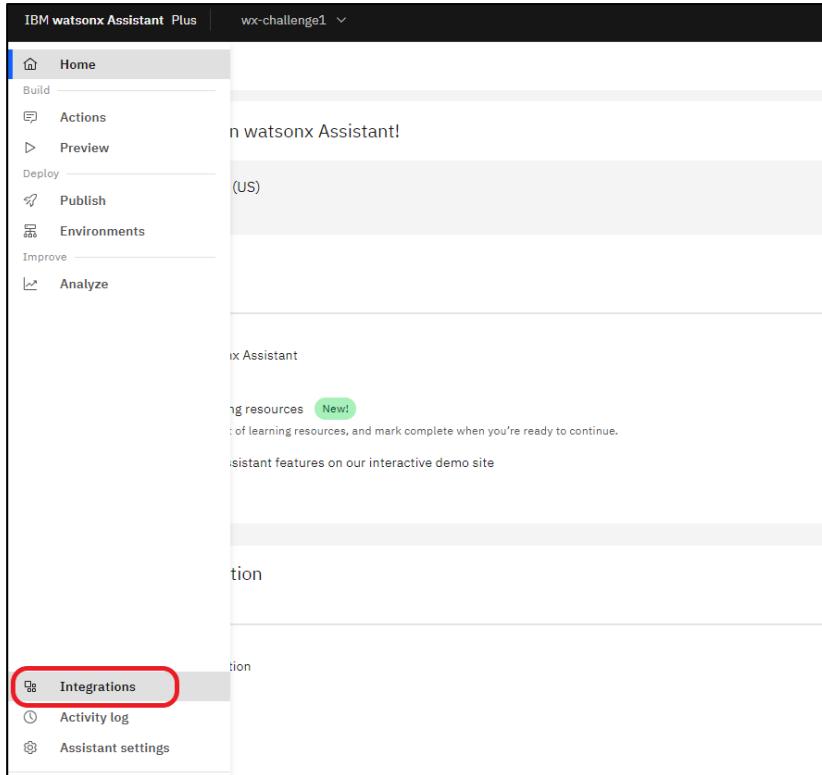
6. Preview the assistant and click the **Create** button.



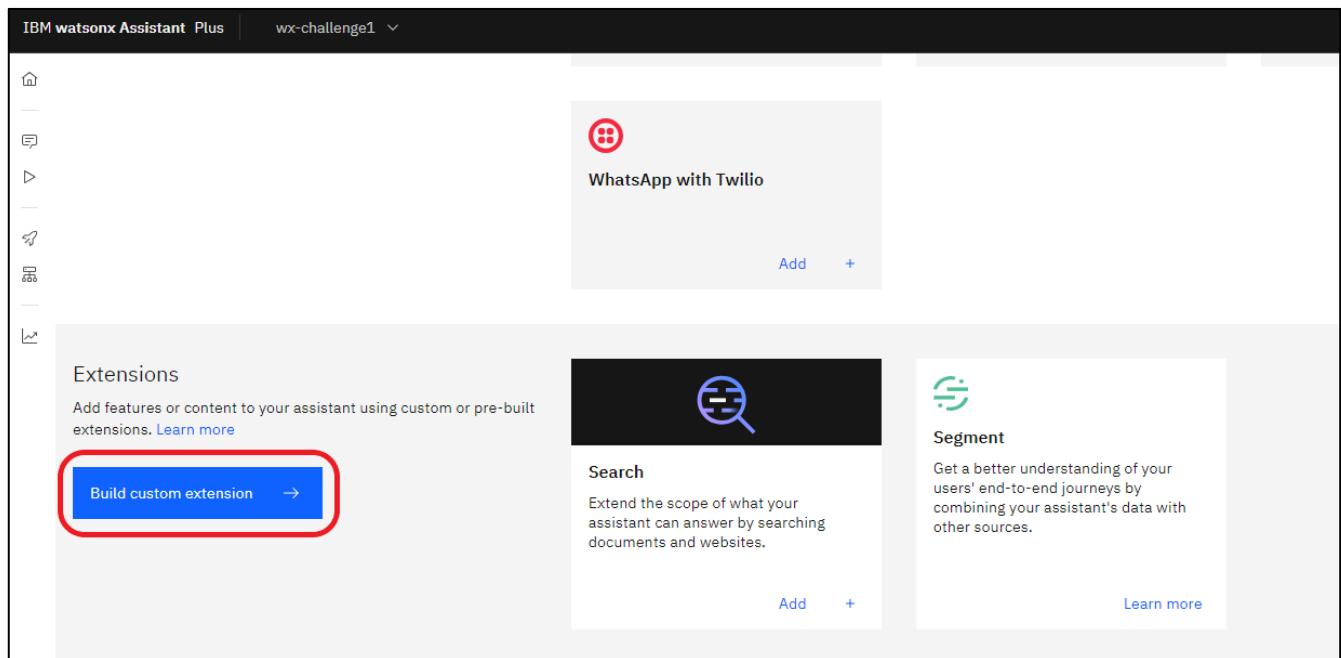
An Assistant will be created, and you will be taken to its dashboard.

## Setup and integrate Turbonomic as an extension with watsonx Assistant

1. Download the Turbonomic open API specification file from the extension starter kit – [TurbonomicActionsAPI.json](#) (Click the download icon  at the upper left of the GitHub code editor window.)
2. Select **Integrations** on the left pane of the watsonx Assistant dashboard.



3. Scroll down to the section called “Extensions” and click on the **Build custom extension** button.



4. Review the **Get Started** steps and click the **Next** button.
5. Enter an extension name **Turbonomic-extension** with an optional description and click the **Next** button.

## Custom extension

The screenshot shows the 'Basic information' step of the 'Custom extension' wizard. At the top, there are four tabs: 'Get started' (selected), 'Basic information' (highlighted with a blue border), 'Import OpenAPI', and 'Review extension'. The main area is titled 'Basic information' with the sub-instruction 'Having a clear name and detailed description will help provide context and clarity to what your extension does.' Below this, there are two input fields: 'Extension name' containing 'Turbonomic-extension' and 'Extension description' containing 'Turbonomic-extension'.

6. Import the openAPI file that was previously downloaded ([TurbonomicActionsAPI.json](#)) and click the **Next** button.

The screenshot shows the 'Import OpenAPI' step of the 'Custom extension' wizard. At the top, there are four tabs: 'Get started' (selected), 'Basic information' (highlighted with a blue border), 'Import OpenAPI' (selected), and 'Review extension'. The main area is titled 'Import OpenAPI' with the sub-instruction 'Import an OpenAPI document in a .json format, describing the authentication and methods for your extension.' Below this is a file input field with the placeholder 'Drag and drop file here or click to upload...' and a file selection box showing 'TurbonomicActionsApi.json'.

7. Review the extension details and click the **Finish** button.

The screenshot shows the 'Review extension' step of the 'Custom extension' wizard. At the top, there are four tabs: 'Get started' (selected), 'Basic information' (highlighted with a blue border), 'Import OpenAPI' (selected), and 'Review extension' (highlighted with a blue border). The main area is titled 'Review extension' with the sub-instruction 'Review the servers and extension resources provided in the OpenAPI document.' Below this are three sections: 'Review authentication' (listing 'API key auth' with 'api\_key in query' as required), 'Review servers' (listing 'https://[host]/a/turbo-actions/prod' with 'host' as a variable), and 'Review operations' (listing two operations: '/turbo\_actions\_nobrainers' (GET) and '/turbo\_health' (GET)).

- Notice that the new extension will be created at the Extensions section of the assistant dashboard. Click the **Add +** button. A pop-up will appear. Click the **Add** button again to confirm.

The screenshot shows the 'Extensions' section of the Watson Assistant dashboard. It includes a 'Build custom extension' button, a 'Search' extension card, a 'Segment' extension card, and the 'Turbonomic-extension' card which has been added. The Turbonomic-extension card shows its icon, name, and a brief description.

- Review the **Get Started** steps and click the **Next** button.
- Configure authentication settings by selecting the type as **API key auth**
- Enter the **API key** - 2ea7272d-6b9c-43f3-9334-ce2143f8644b
- Click the **Next** button.

The screenshot shows the 'Custom extension' configuration page with the 'Draft' status. The 'Authentication' tab is selected. It shows the 'API key auth' type selected, an API key input field containing a redacted value, and a 'Servers' dropdown set to 'https://(host)/a/turbo-actions/prod'. Below it, a 'Generated URL' box shows 'https://pliant.demo.turbonomic.com/a/turbo-actions/prod'. A 'Server variables' section contains a 'host' variable set to 'pliant.demo.turbonomic.com'.

- Review operations and click the **Finish** button.

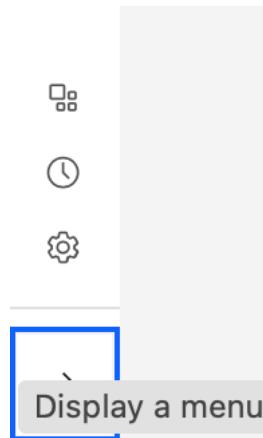
The screenshot shows the 'Custom extension' configuration page with the 'Review operations' tab selected. It shows the 'Get started', 'Authentication', and 'Review operations' tabs at the top. The 'Review operations' section displays a table of operations defined in the OpenAPI document:

Operation	Method	Resource
/turbo_health	GET	/turbo_health
/turbo_actions_nobrainers	GET	/turbo_actions_nobrainers

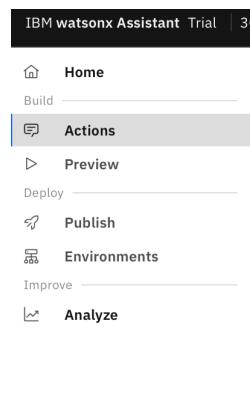
The Turbonomic extension will now be successfully integrated.

## Setup actions in watsonx Assistant to get insights from Turbonomic

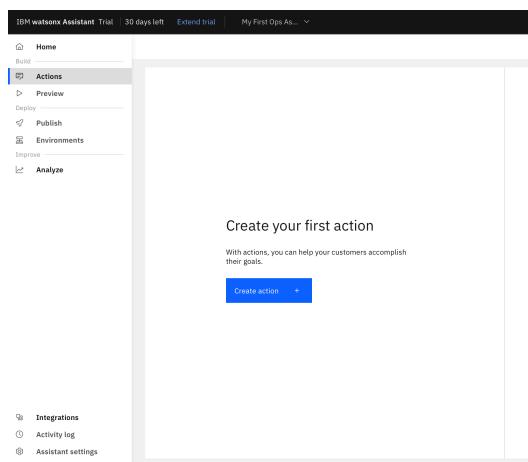
1. In the bottom left corner click the > to open the navigation pane



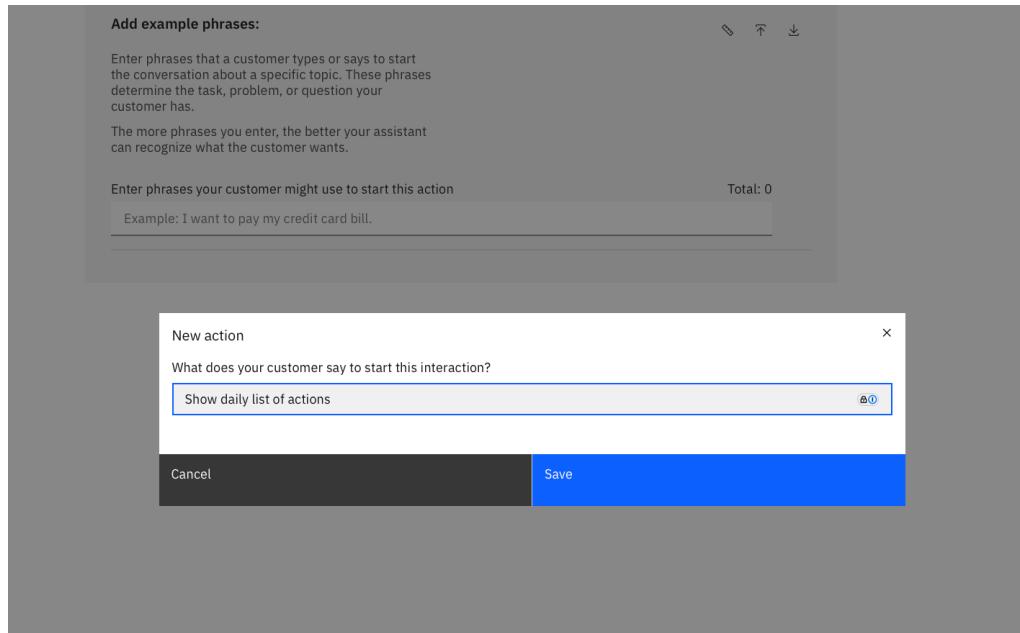
2. Select **Actions**



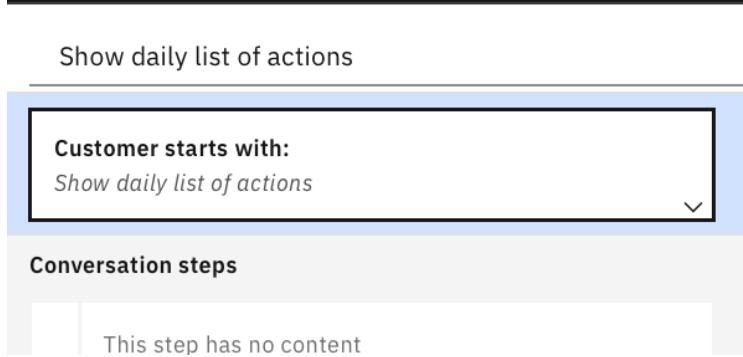
3. Click on Create Action +



4. Select Start from scratch option.
5. Enter the **New Action** prompt: *Show daily list of actions*



6. Click **Save**.
7. On the top left click on box **Customer starts with:**



8. On the main page add 5 more phrases for questions asking Turbonomic about non-disruptive actions. Here are a few examples:

Add example phrases:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

Enter phrases your customer might use to start this action Total: 3

Enter a phrase

daily no brainer actions

suggest actions to improve performance without risking disruption

Show daily list of actions

## 9. On left click on **Conversation steps**

Conversation steps

1 This step has no content

↓ Continue to next step

## 10.Click Continue to next step under And then

Step 1

Is taken without conditions

Set variable values *fx*

Assistant says

For example: What size do you want to order?

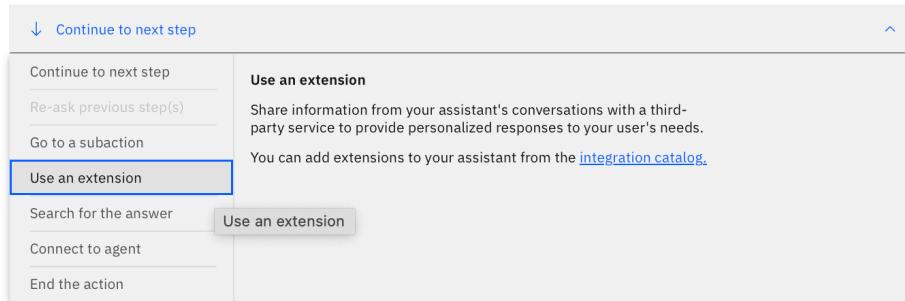
Define customer response

And then

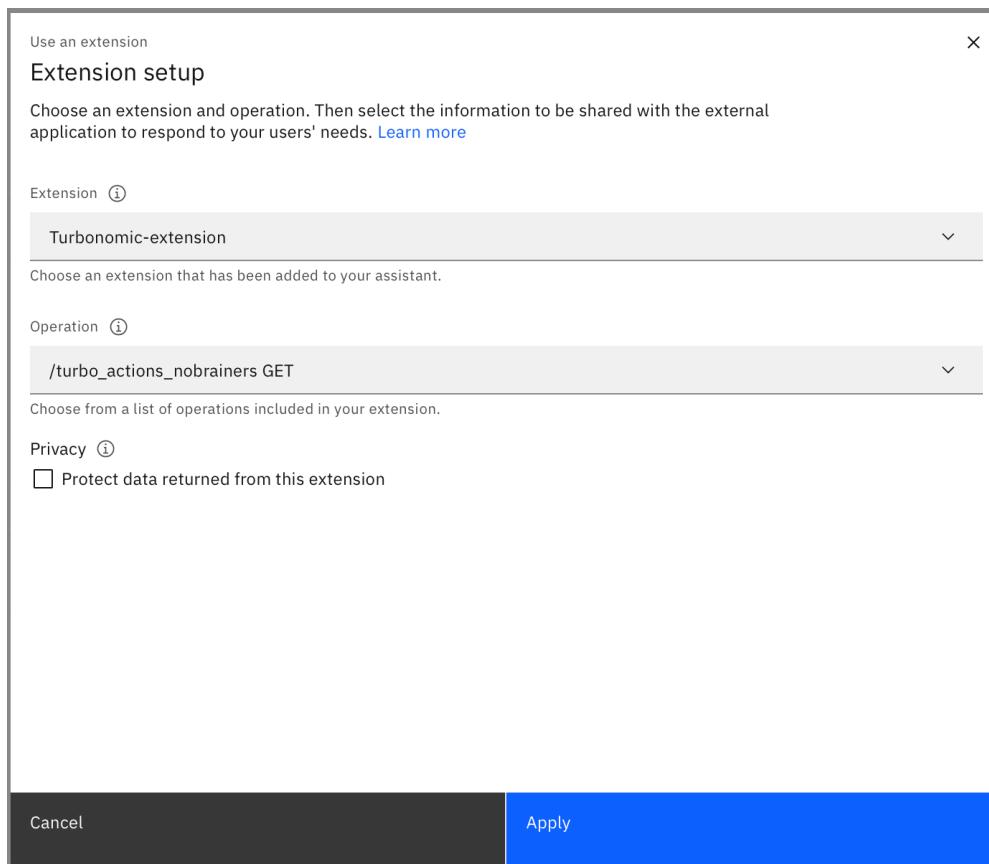
↓ Continue to next step

## 11.Select Use an extension.

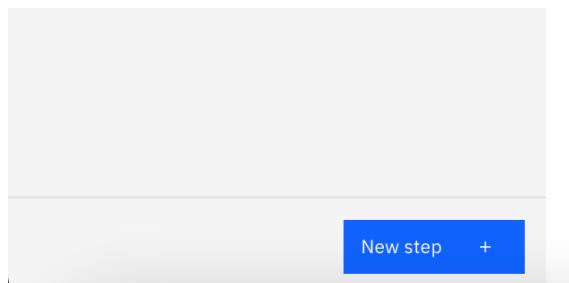
And then



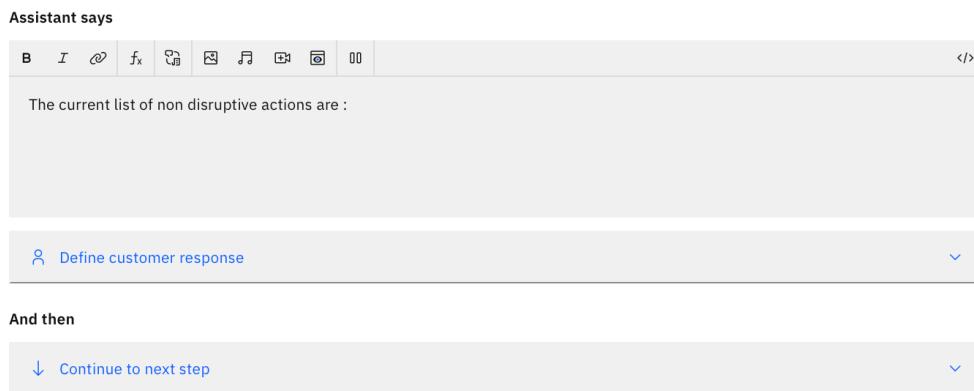
12. In the **Extension** setup popup under **Choose an Extension**, select *Turbonomic-extension* and under **Operation** select */turbo\_actions\_nobrainers GET*. Click **Apply**.



13. Click **New Step +** in the lower-left corner of the screen.



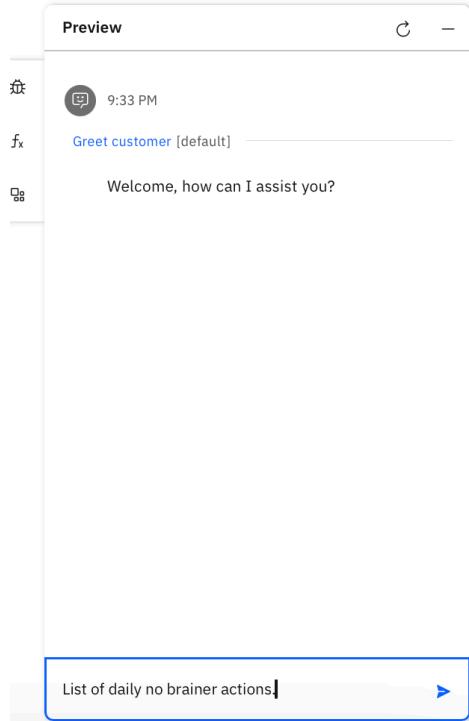
- 14.In Assistant says box type *The current list of non-disruptive actions are:* and hit the *Enter* key to go to the next line



- 15.In action description box under **Assistant says** select **fx** and then **Turbonomic-extension( step 1 )** and then **body.result**



- 16.Click **Preview** in the lower right corner.  
17.In the chat box where it says Type something... enter List of daily no brainer actions.



### Submission #1

Take a screen capture of the page and note down the action with the highest savings per month

- 18.Click **New Step +** in the lower-left corner of the screen.
- 19.Click on Continue to next step under And then
- 20.Select Use an extension
- 21.In the **Extension** setup popup under **Choose an Extension**, select *Turbonomic-extension* and under **Operation** select */turbo\_health GET*

Use an extension

X

**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 

Turbonomic-extension

▼

Choose an extension that has been added to your assistant.

Operation 

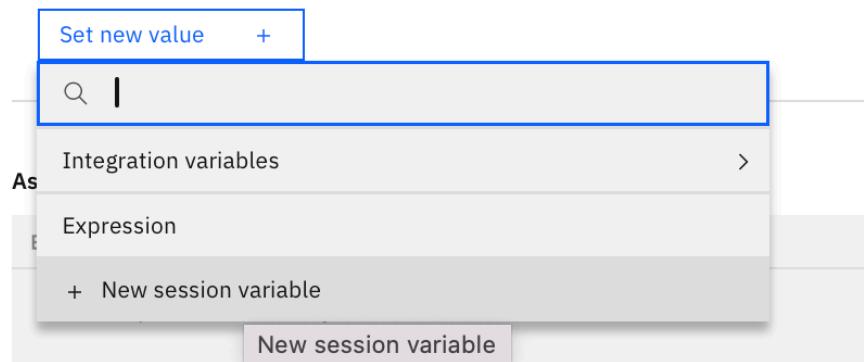
/turbo\_health GET

▼

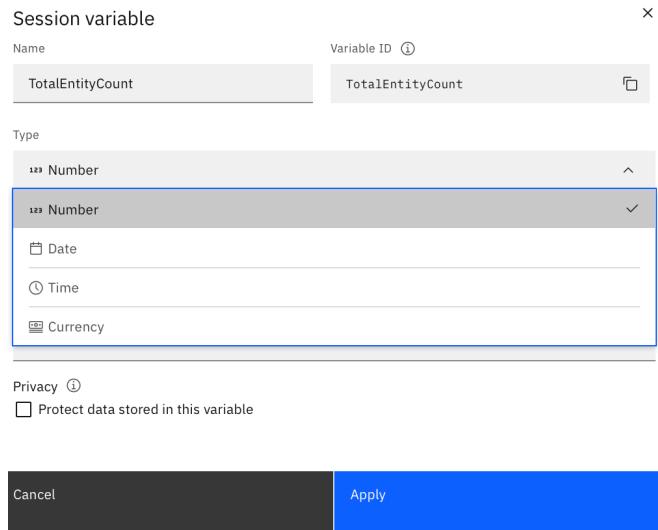
Choose from a list of operations included in your extension.

Privacy  Protect data returned from this extension**22.Click Apply.****23.Click New Step + in the lower-left corner of the screen.****24.In top corner of the main page click on Set variable value****25.Click Set new value + -> New Session variable**

Variable values

Set variable values. [Learn more](#).**26. Set the following values and click Apply**

- Name – *TotalEntityCount*
- Type – *Number*



## 27.Under To box select Expression

Set variable values. [Learn more.](#)

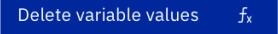
28.In the Expression box type \$ to bring up the variable list and select

**Turbonomic-Extension (step 3)** and then **body.health**

29.After body.health add a . and then the path to item value needed. In this case add **.entitiesCount** and click **Apply**

30.In action description box under **Assistant says** enter *The Total Entities are*

Step 4 

Is taken without conditions  

Variable values 

Set variable values. [Learn more.](#)

**Set**  **TotalEntityCount** **To**   **.entitiesCount**  

**Set new value** 

**Assistant says**

B I            

The Total Entities are

 Define customer response 

**And then**

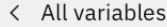
 Continue to next step 

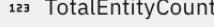
### 31.Click on **fx** -> **Session Variables** -> **TotalEntityCount**

**Assistant says**

B I            

The Total Entities are

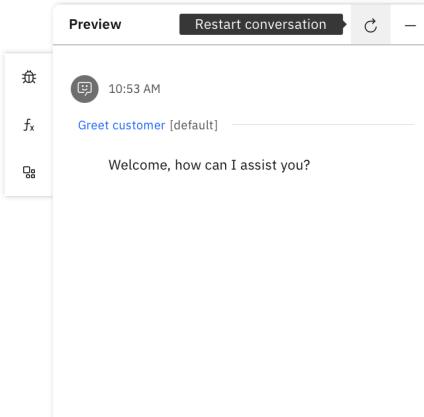
 All variables

  **TotalEntityCount**

 Define customer response 

### 32.Click **Preview** in the lower right corner.

33.Clear the content if needed by click circle icon to restart conversation



34. In the chat box where it says *Type something...* enter *List of daily no brainer actions*

35. Click **Inspect** next to **Extension info**

36. Review the payload returned from turbo\_health api call. Use the to extend the window

37. Notice where we go the value for *entitiesCount*

**Submission #2** – Use this example to have the chat bot return the complete health status of Turbonomic entities. The output should display at minimum

- the total number of entities
- the % of entities in a "critical state"
- the % of entities in a "minor state"
- the % of entities in a "normal state"

Example output:

Total entities: <body.health.entitiesCount>

- Critical: X%
- Minor: Y%
- Normal: Z%

Here is an example to calculate % for entities type like *Critical*:

$T(Math).round((CriticalCount / TotalEntityCount)*100)$

**Take a screen capture of the chatbot dialog window displaying the results with values**

Reference:

- Building Actions - <https://cloud.ibm.com/docs/watson-assistant?topic=watson-assistant-build-actions-overview>
- Writing Expressions: <https://cloud.ibm.com/docs/watson-assistant?topic=watson-assistant-expression-methods-actions#expression-methods-actions-numbers-standard-math>
- Java.lang.Math():  
<https://docs.oracle.com/javase/7/docs/api/java/lang/Math.html>

## Final deliverables

At the end of this watsonx Challenge email your results to [sahuja@us.ibm.com](mailto:sahuja@us.ibm.com) with the following details:

1. Your name
2. Submission #1
  - Screen capture of the conversation with Turbonomic list the no brainier actions and save this image
  - Answer the question :
    - Which action delivers the highest savings per month?
    - How much is it ?
3. Submission #2 - Screen capture chatbot showing the total entities with the percentage distribution of their health under the following categories : Critical, Minor and Normal.
4. Best contact email and phone to receive winner notification, if applicable

Please note incomplete submissions will be automatically disqualified.

