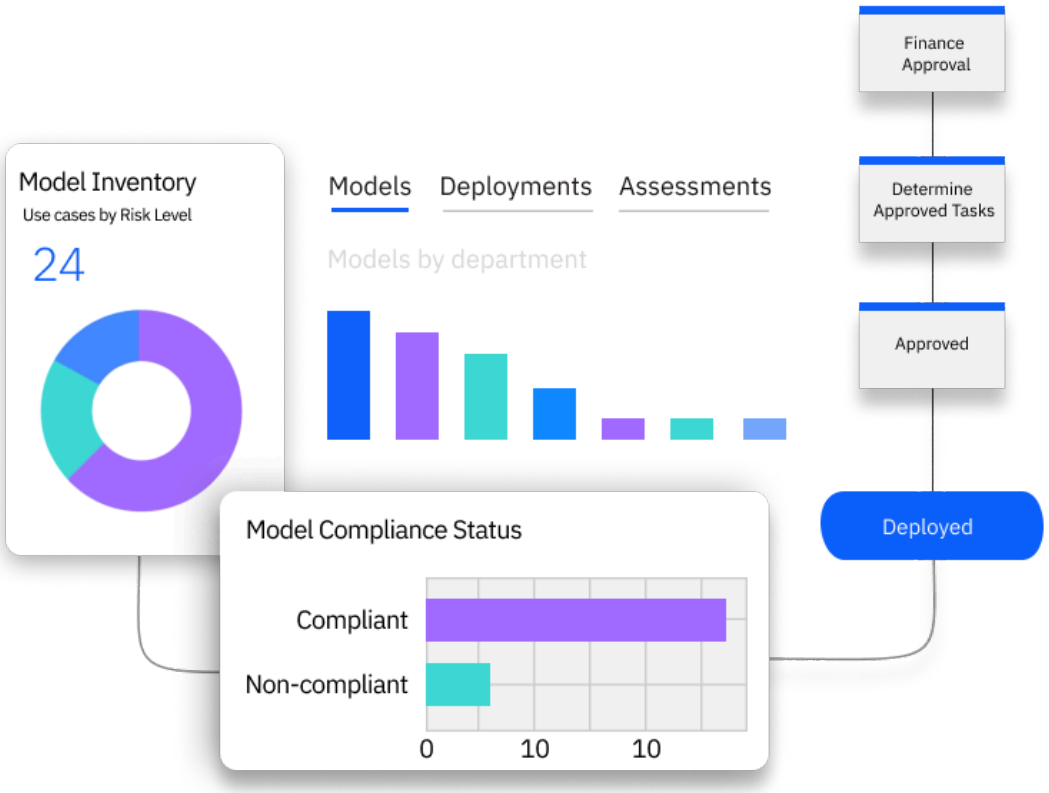
Monitor and Govern AI with watsonx.governance Day 1

Hands-on Lab Guide



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Day 1

Introduction

Welcome to part one of the Deloitte watsonx.governance hands-on lab. In this lab, you will explore the watsonx.governance solution from the perspective of a day-to-day user as the govern a model, from the initial use case request through to production deployment.

In this lab, you will:

- Create an AI use case to address a business problem
- Progress that use case request through a workflow
- Identify risks associated with the use case
- Evaluate the identified risks
- Explore dashboards and reporting on an enterprise level
- Drill down into specific metrics gathered for individual models

A note on the environment

To complete this lab, you will use a Cloud Pak for Data software environment provisioned on IBM TechZone, with the watsonx.governance software installed. Your lab instructor will provide you with credentials to log into this environment.

Please note that this is a shared environment, meaning that others in the lab will be able to view as well as edit or delete the artifacts you create. In a production deployment of watsonx.governance, the environment and user accounts would be created and configured to prevent these conflicts; however, that is beyond the scope of this lab. Please be mindful of this, and adhere to the following guidelines:

- Only work with artefacts (use cases, risk assessments) that you or your group has created.
- Include unique identifying information such as your name email address when creating use cases.

Customization

It is important to understand that all of the pieces of watsonx.governance that you will use in the following lab are fully configurable. AI use cases can be customized to include any level of detail the client requires. Workflows can be modified or built from scratch to reflect the client's approval processes. Relevant risks and the questionnaires that associate them with use cases can also be completely configured to meet a client's needs.

Troubleshooting

The environment you are using for this lab has been provisioned on IBM TechZone. Due to infrastructure constraints, you may experience some delay or slow performance. This frequently appears as error messages when saving changes to artefacts such as use cases or workflows. The vast majority of the time, the save was actually successful. Refreshing the screen will fix most of the issues; if this does not work, try the action again. If the action continues to fail, contact your lab instructor for more help.

Intake and risk assessment

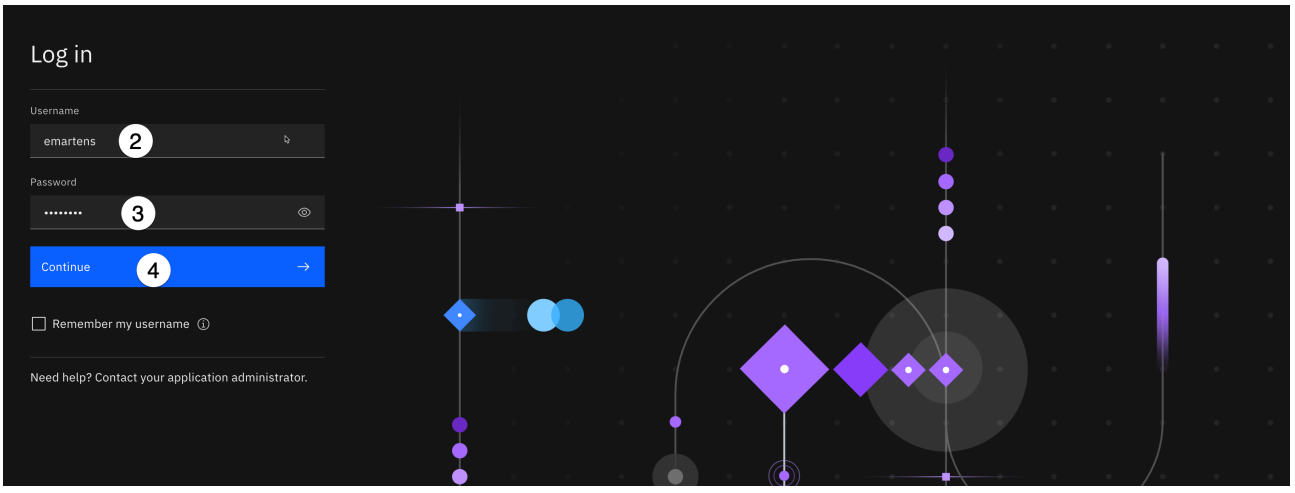
The model governance process begins with the creation of a model use case. A use case is meant to track and capture information about a collection of models and prompts that will be built to serve a particular purpose. A use case should be created whenever there is a business need requiring the use of a model (AI or non-AI) to be built. Model records should then be added as a child of the use case.

In this section of the lab, you will log into the watsonx environment. You will then use the governance console to create a use case, identify associated risks, evaluate those risks, and then review and approve the use case for active development. In completing the actions described in the lab, you will take on many different organizational roles, from the business users making the initial request to the risk managers evaluating the risks. Actually switching between different user personas is beyond the scope of this lab. However, note that watsonx.governance provides fully-featured role-based access control, allowing clients to completely customize user permissions and data access.

1. Log into the environment

Your lab instructor will provide credentials for the Cloud Pak for Data or watsonx environment, including a URL, username, and password. Note that in a real-world situation, administrators would likely integrate the environment with whatever authentication method they use in day-to-day operations, and assign permissions, roles, and groups based on those IDs.

1. In a different browser window, navigate to the provided URL.
2. Enter the provided username in the Username field.
3. Enter the provided password in the Password field.
4. Click on the Continue button to log in.

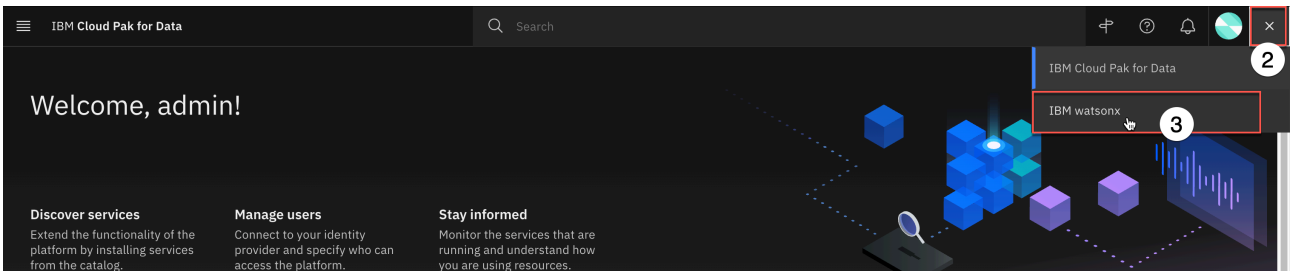


2. Switch contexts

The IBM watsonx context offers an improved user interface and better integration for AI governance than the Cloud Pak for Data context, and offers expanded functionality such as monitoring for detached prompt templates. Some operations, such as creating a database, currently require using the Cloud Pak for Data context. However, for the remainder of the lab, you will use the IBM watsonx context.

1. Log into the Cloud Pak for Data home page using the credentials from your reservation.
2. Click on the grid icon in the upper right to open the context menu.

3. Click on the IBM watsonx menu item to change the context. A Welcome to watsonx popup window may open.



4. Close the popup window, or click the Take a tour button if you wish.

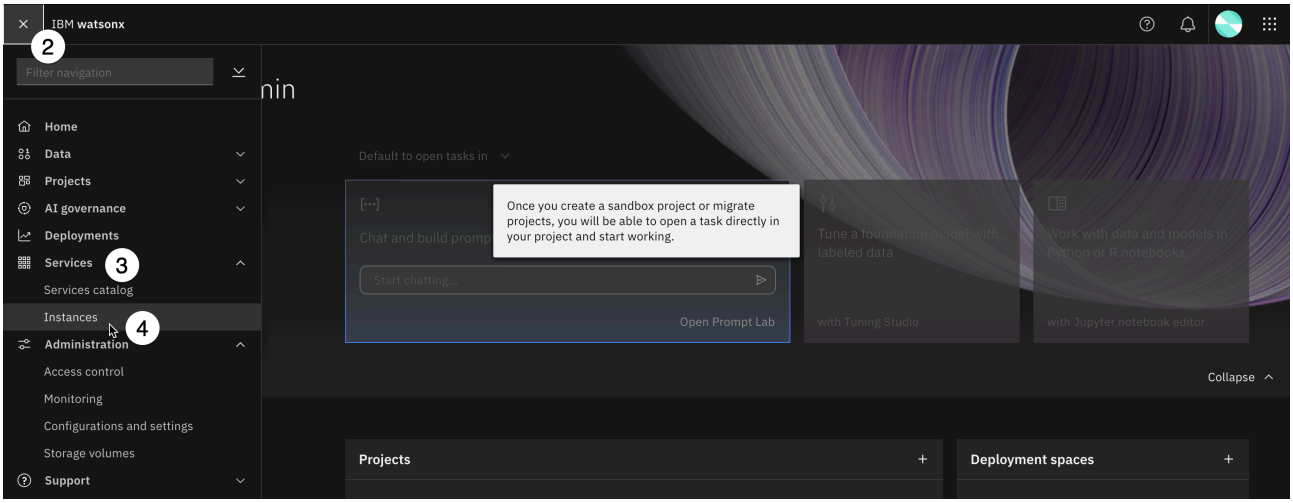
Your screen should now show IBM watsonx branding. This screen will be referred to throughout the lab as the watsonx home screen.

> Note: You may need to switch to the watsonx context if you log out and then log back into your environment.

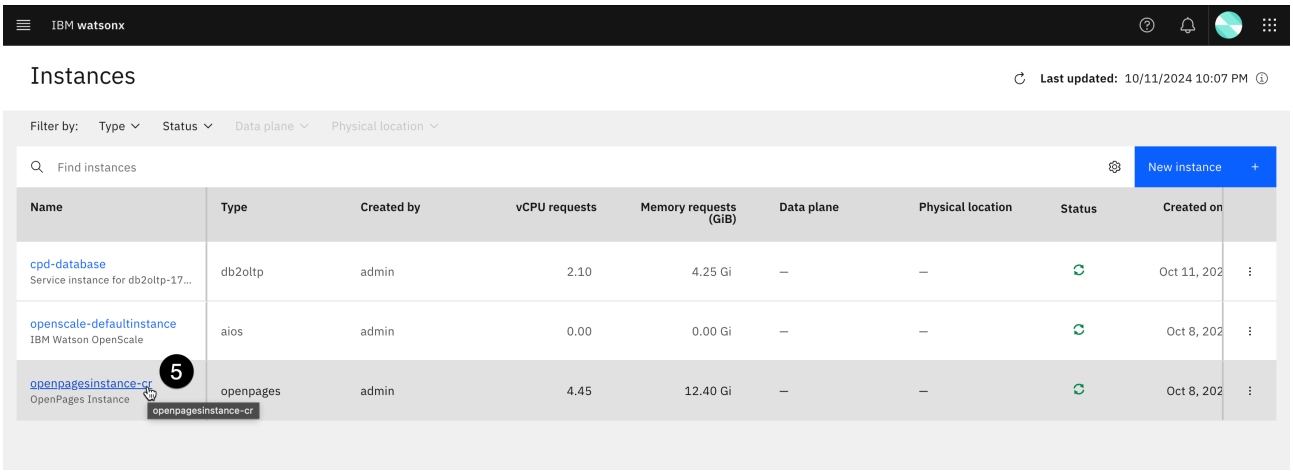
3. Launch the governance console

In this section, you will launch the OpenPages service.

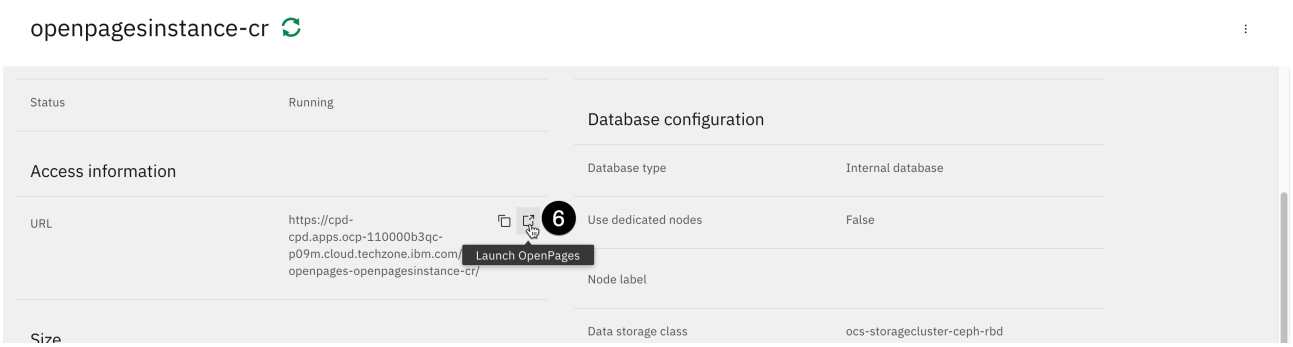
1. If necessary, return to the watsonx home page by clicking the IBM watsonx link in the upper left.
2. Click on the hamburger menu in the upper left.
3. Click on the Services item from the menu to expand it.
4. Click on Instances to open the Instances screen.



5. Locate the instance of OpenPages in the table and click on the link in the Name column to open the instance details screen.



6. Scroll down to the Access information section, and click the launch icon to launch the service.



The watsonx governance console (OpenPages service) launches.

4. Change user profiles

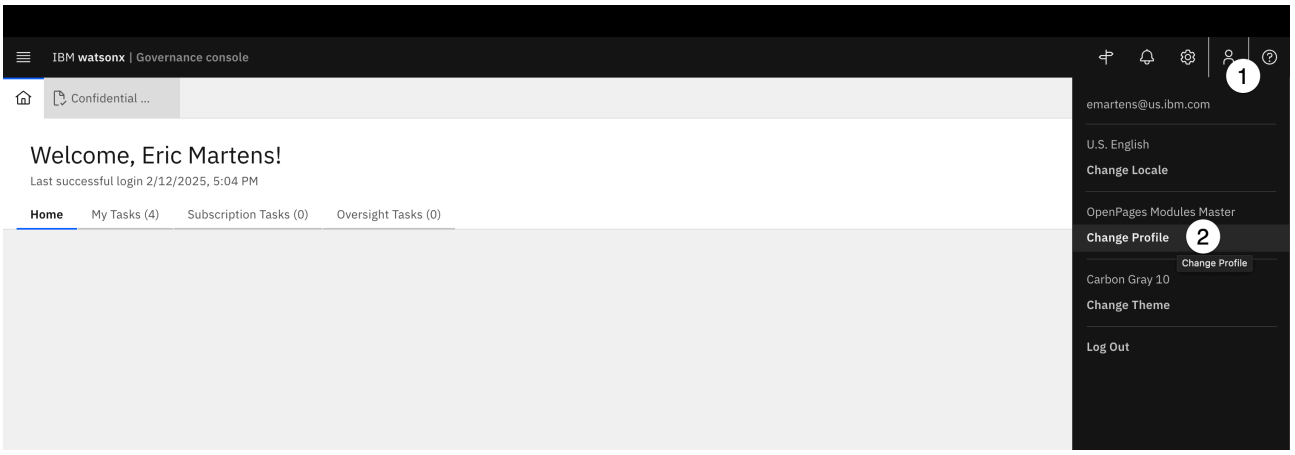
Access and views in the governance console is managed via user profiles. As with anything in the console, it can be customized to fit an organization's needs. Each user can have as many profiles assigned as needed, and they can switch between those profiles depending on the task they need to accomplish.

A user's profile primarily determines the information present in the various views, which allows administrators to configure the tool so that each user sees exactly the information they need, without being overwhelmed with unnecessary options.

For this lab, you have been assigned all the available pre-configured roles for watsonx.governance. Again, in a real-world situation, a user would likely only have one or two profiles, but that level of user management is beyond the scope of this lab.

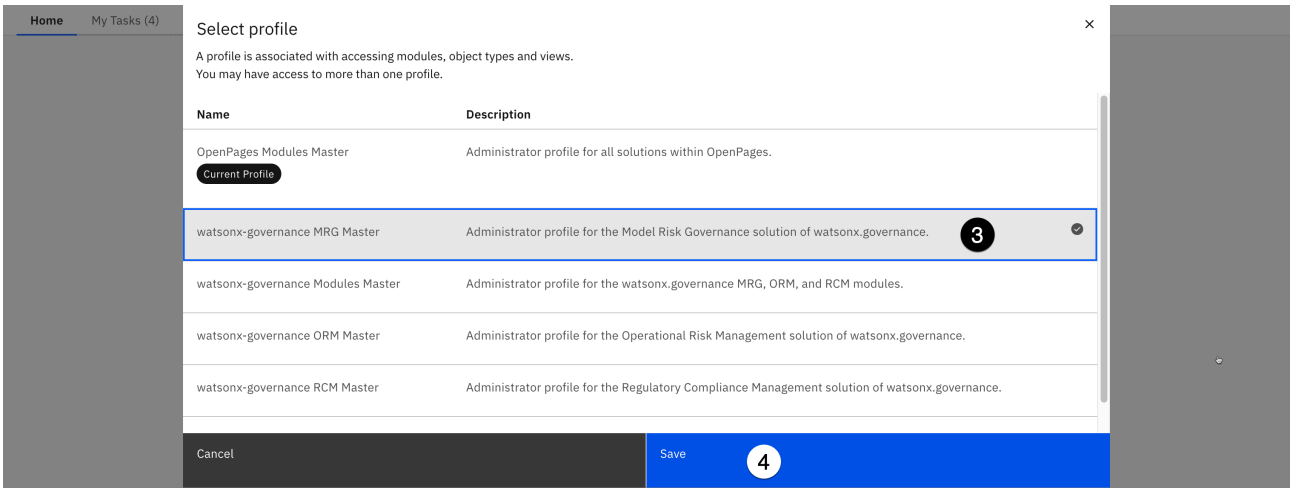
To continue, you will need to change your role to that of watsonx.governance MRG (Model Risk Governance) Master.

1. Click on the avatar icon in the upper left of the screen. The user menu opens.
2. The current profile likely shows as OpenPages Modules Master. Click on the Change Profile menu item. The Select profile dialog opens.



3. Click on the watsonx-governance MRG Master profile from the list to select it.

4. Click on the Save button to save your choice.



Each time you sign in, you should now sign in as the watsonx-governance MRG Master profile.

5. Create a model use case

To ensure that model use cases are tracked across the entire solution, they should be created using the watsonx governance console. During the configuration of the environment you are using, the administrator turned on integration between the governance console (OpenPages) and watsonx, so any actions related to model use cases should now redirect you to the governance console interface.

Only the models that you add to use cases are tracked with AI Factsheets. You can control which models to track for an organization without tracking samples and other models that are not significant to the organization.

In a real-world scenario, this action would be performed by an organizational stakeholder who would like to request the development and implementation of a model; in this case, the manager of the human resources department, who is unable to keep up with the volume of resumes submitted for employment opportunities and would like help from an AI solution.

Choosing a use case

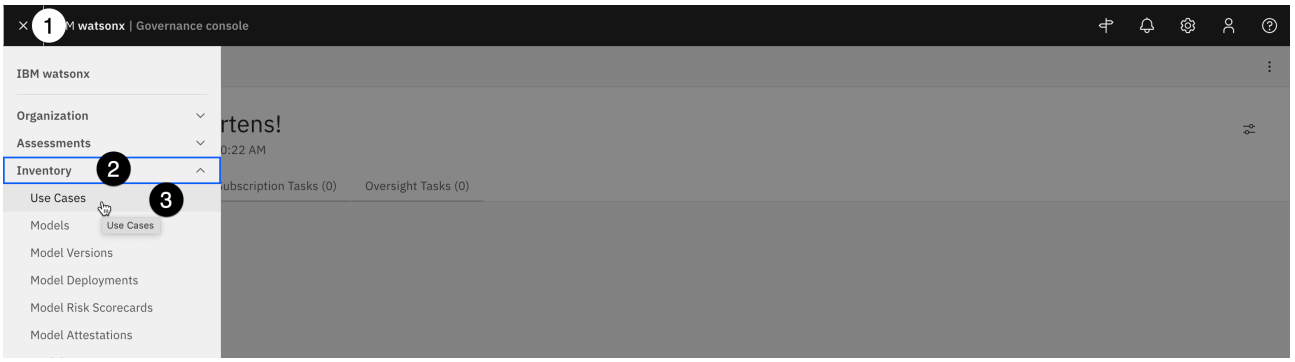
In this section, of the lab, you will create a use case based on a business need. As part of the process, you will then fill out a questionnaire to identify potential risks associated with that use case. Feel free to create a use case from previous experience you had with a client. Take a moment to think of a business problem

that a client would use AI or machine learning to solve. You may also use one of the sample use cases provided for you. When you have identified a use case, proceed with the lab.

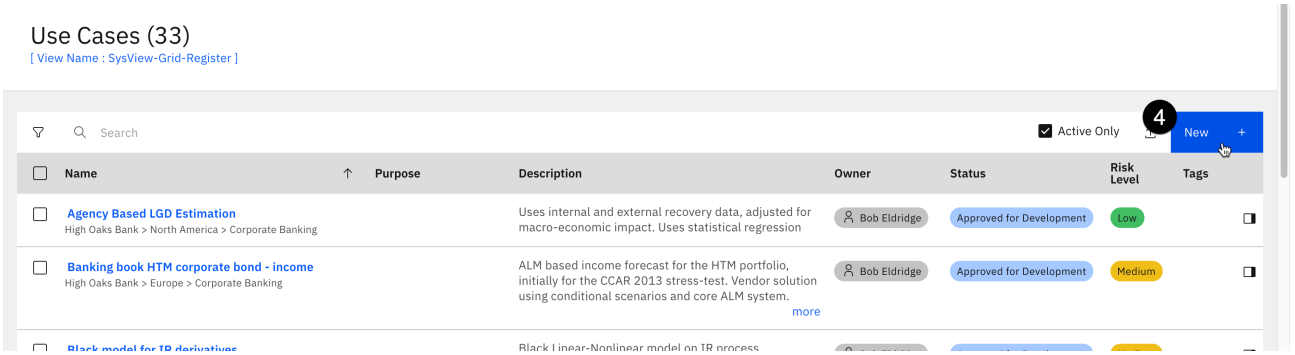
1. Click on the hamburger menu in the upper left.

2. Click on the Inventory menu item to expand it.

3. Click on the Use Cases menu item. The Use Cases tab opens. Note that this tab will be empty, but will populate as others doing the lab create use cases in this environment.



4. Click the blue New button. The New Use Case tab opens.

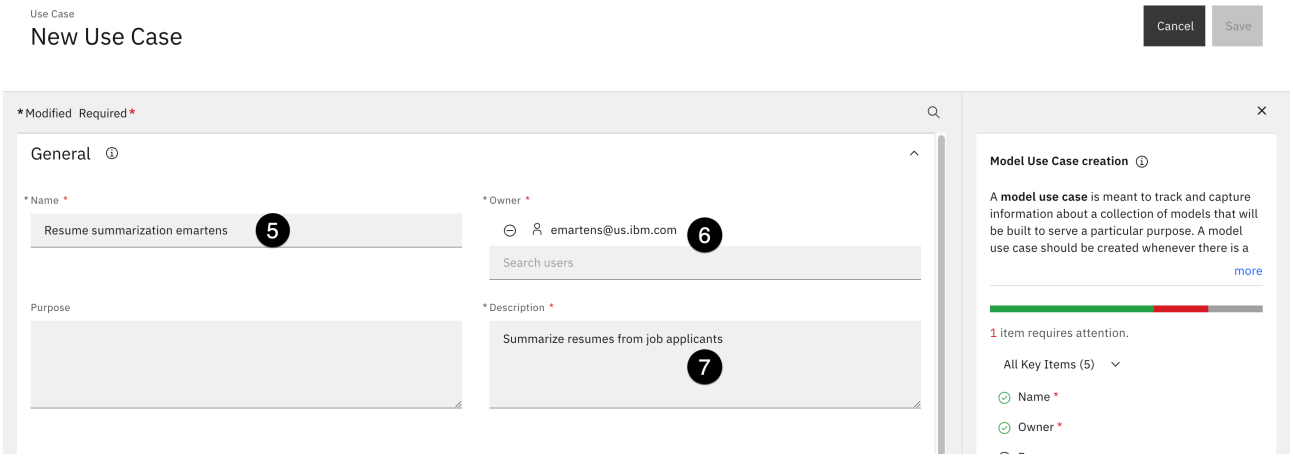


Note that the Model Use Case creation information panel on the right of the screen offers helpful information about model use cases, as well as a list of required fields. Clicking on any of the fields in that panel will scroll the screen directly to that portion of the form, helping you quickly rectify any items needing attention.

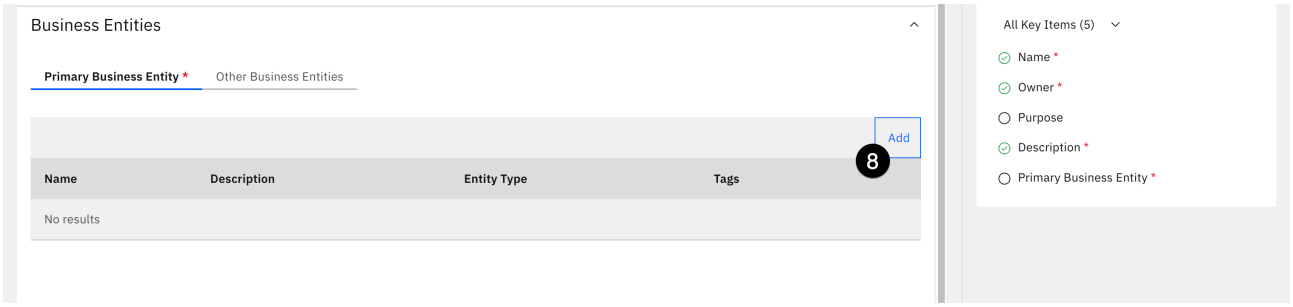
5. In the General section of the form, enter the name of your use case in the Name field. Note that when you enter a value in the field, the progress bar in the Model Use Case creation information panel updates. For this lab, it may be helpful to include your name or email address in the use case name, as some of your colleagues may be creating similar use cases.

6. Click the Owner field and enter the name of the user you signed in with into this field.

7. Enter a description in the Description field.

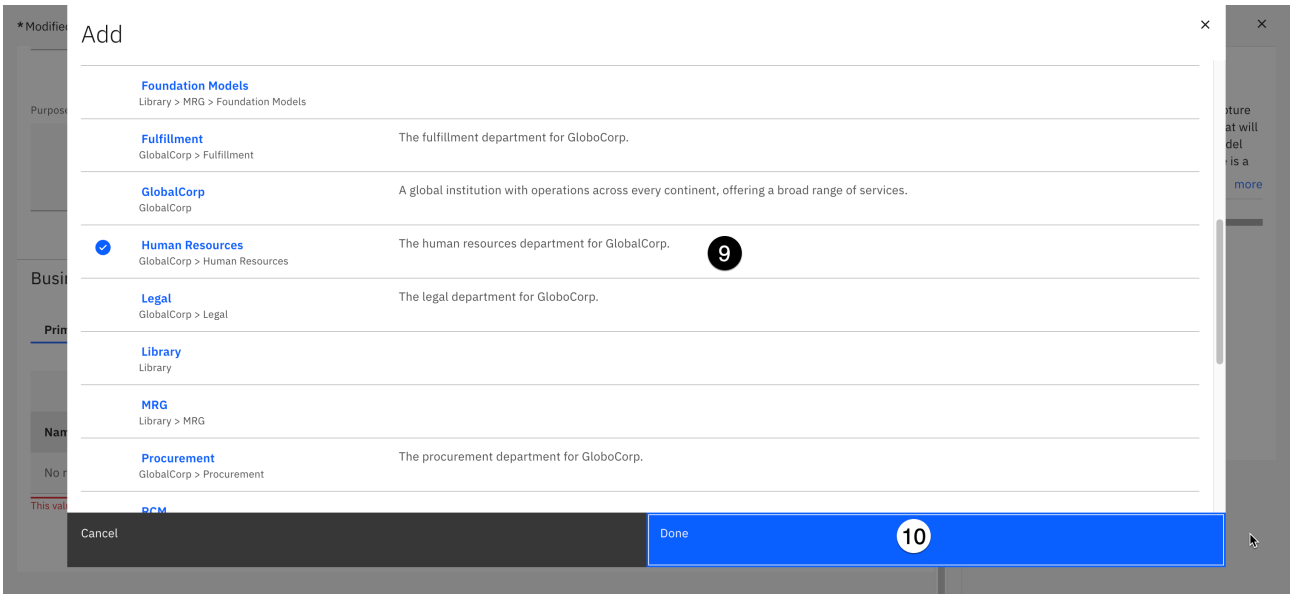


8. All model use cases are owned by business entities, representing the part of the organization responsible for requesting the use case. In the Business Entities section of the form, click the Add button. The Add window opens with a list of business entities defined for the organization.



9. The list of business entities includes a variety of corporate departments such as Human Resources, Legal, and Procurement. Choose one that best fits your use case from the list and click on it to select it.

10. Click Done to add the business entity to the use case. The Add window closes.



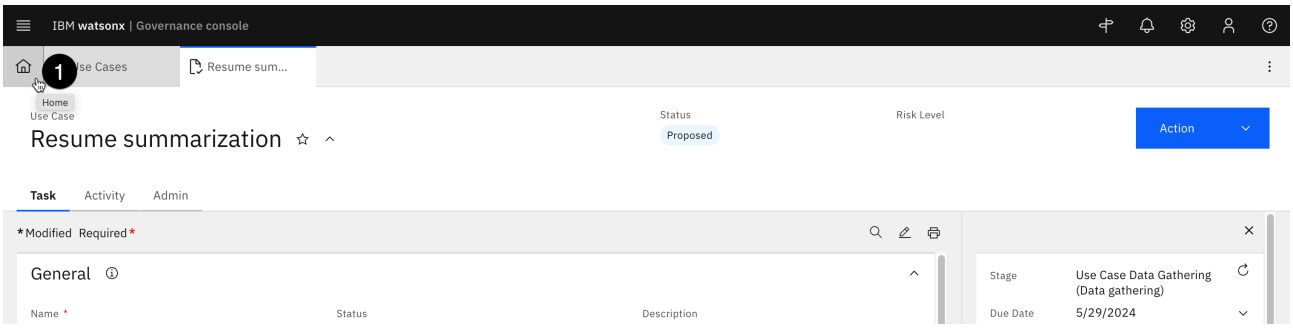
11. Click the Save button in the upper right to save the use case.

To progress the use case through the workflow, you will now need to perform the actions specified in the Action items in the workflow.

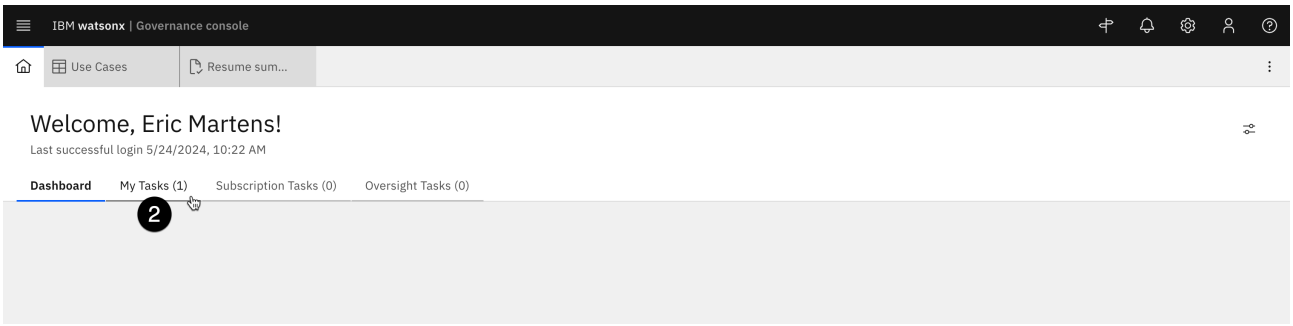
6. Progress the use case to the next phase

The use case request has progressed to the data gathering stage of the workflow, and has been assigned as an action for the appropriate owner. Recall that owners of each stage of the workflow can be configured, and alerts assigned.

1. Click on the Home icon in the upper left to return to the user's home tab.

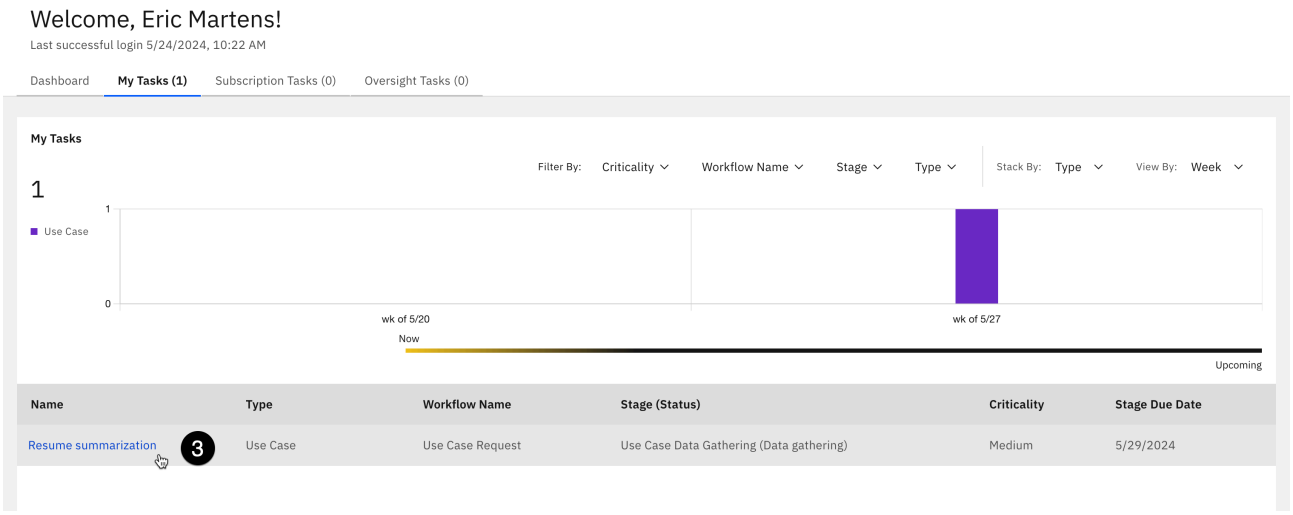


2. Note that the My Tasks tab now shows a new entry. Click on the tab to open it.



The My Tasks tab shows a list of all the current tasks assigned to the user. It can be filtered by a variety of fields. At the moment, it only contains a single task, showing that the use case request is in the data gathering stage and is in need of action, along with the stage due date.

3. Click on the link for the use case in the table to return to the use case request tab.

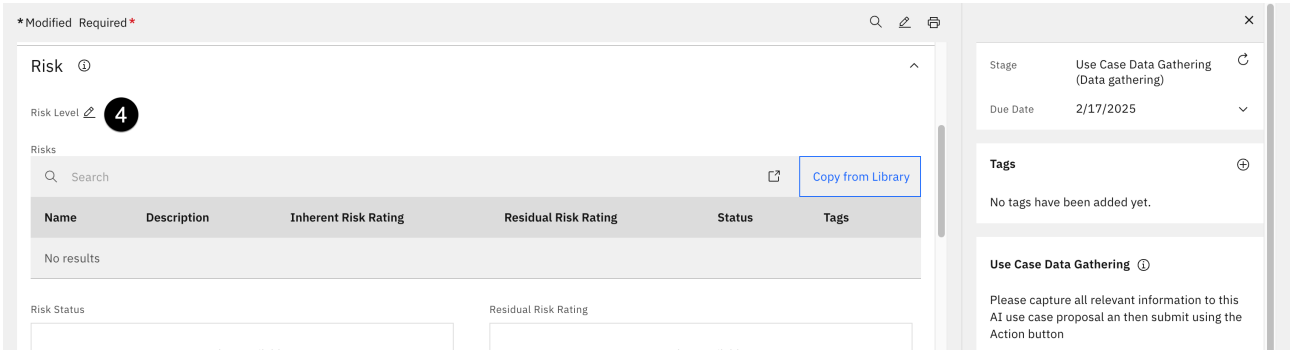


The use case request form shows a standard set of information. However, like all views and forms in the governance console, it can be customized to display data an organization would like to track as part of this process. Information could include things like billing codes, additional documentation or justification, or more. In this case, you will only edit required fields specified in the information panel on the right before progressing to the next stage of the workflow.

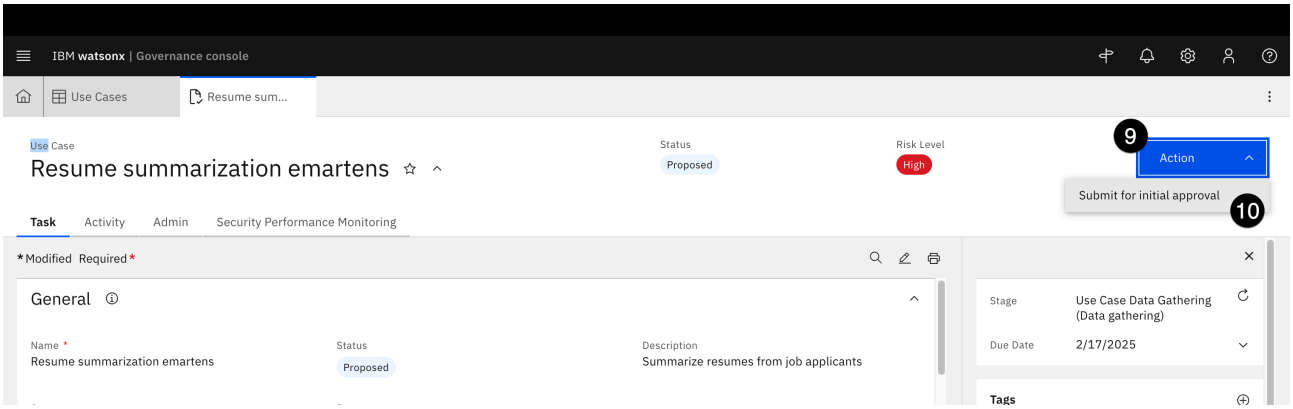
Risk Level represents the risk to the organization should issues arise with the models used to address the requirements laid out by the use case. A full risk assessment is beyond the scope of this lab; however, because hiring and employment violations can lead to expensive litigation damage to an organization's

reputation, this use case in this example (resume summarization) will be marked as high risk. You may choose the risk level most appropriate to your use case.

4. In the Risk section of the form, click on the pencil icon next to the Risk Level field to edit it.

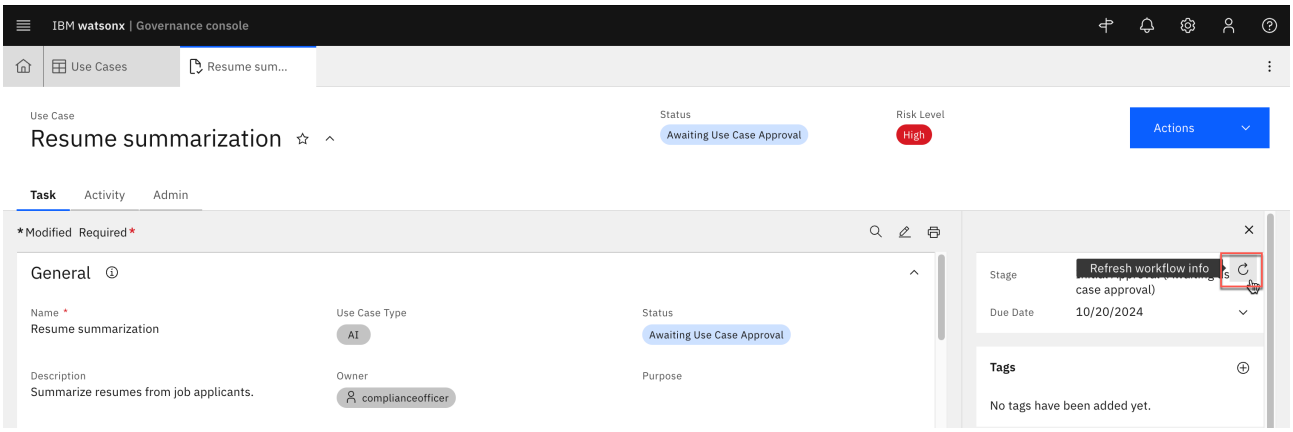


5. Select the appropriate risk level from the dropdown.
6. Scroll to the General section and click on the pencil icon next to the Purpose field to edit it.
7. Fill out a business purpose for your use case.
8. Click the Save button in the upper right to save your changes.
9. Once the changes have been saved, click on the Action button in the upper right to open the Actions menu.
10. Click on the Submit for initial approval action. Note that the text of this action is defined by the Name field given to the action connecting the Use Case Data Gathering stage to the Initial Approval stage in the workflow. The Submit for initial approval confirmation dialog opens.



12. Click the black Continue button to confirm your action, but keep the use case tab open.

> Note: If you receive a Network error message, your change may have been recorded, but network issues may have prevented the screen from refreshing. Try submitting again; if the error persists, click the Refresh workflow info button to the right of the Stage field in the information panel on the right. The Stage should progress to Initial Approval (Awaiting use case approval).



13. When the action completes, note that the Stage field in the information panel on the right has updated once again to Initial Approval.

In order to progress the use case to the next stage (Stakeholder Review) the action in the workflow requires the risk identification questionnaire to be filled out. As that questionnaire has yet to be completed, clicking on the Actions menu for the use case only shows two available actions: rejecting the use case (moving it to the Rejected stage, or returning it to the owner (moving it back to the Use Case Data Gathering stage). In order to continue forward, the questionnaire must be filled out.

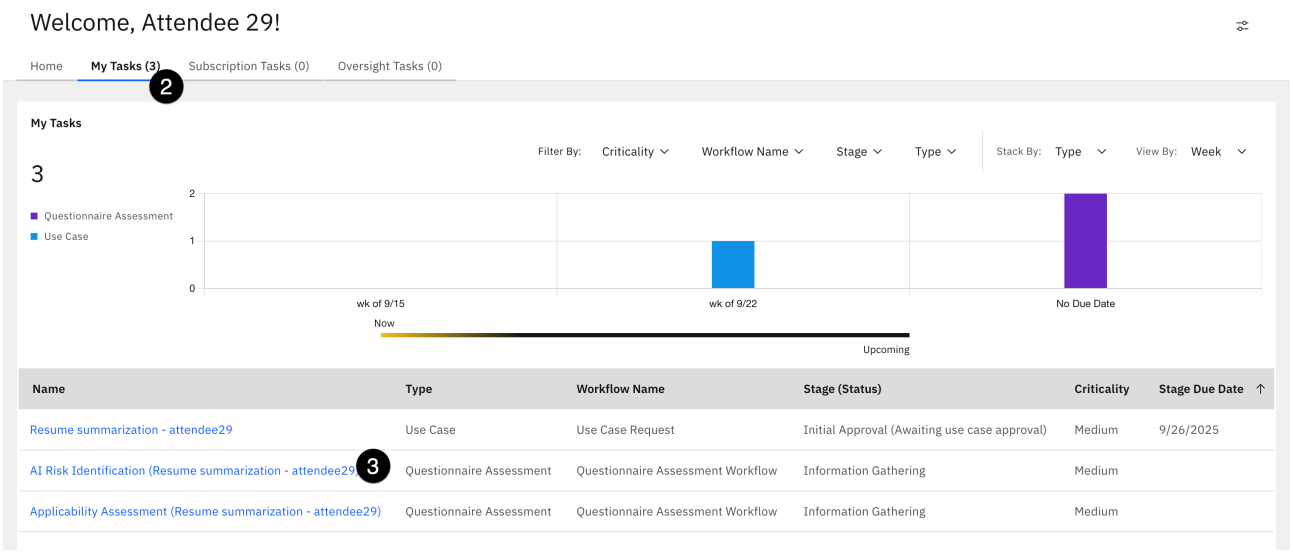
7. Identify use case risks

In this section, you will fill out the default risk assessment questionnaire included in the governance console. This questionnaire, which can be modified to suit an organization's needs and regulatory requirements, has been configured to automatically associate relevant risks from IBM's AI risk atlas based on answers to the questions.

The AI risk atlas is an open source tool to help clients understand some of the risks of working with generative AI, foundation models, and machine learning models.

> Note: If you receive frequent error messages stating that *The requested operation could not be completed*, you are likely encountering an issue with persistent session information in your browser. A browser cache clear may fix this issue, but the best way to avoid these errors is to use your browsers private/incognito mode when signed in as the created user.

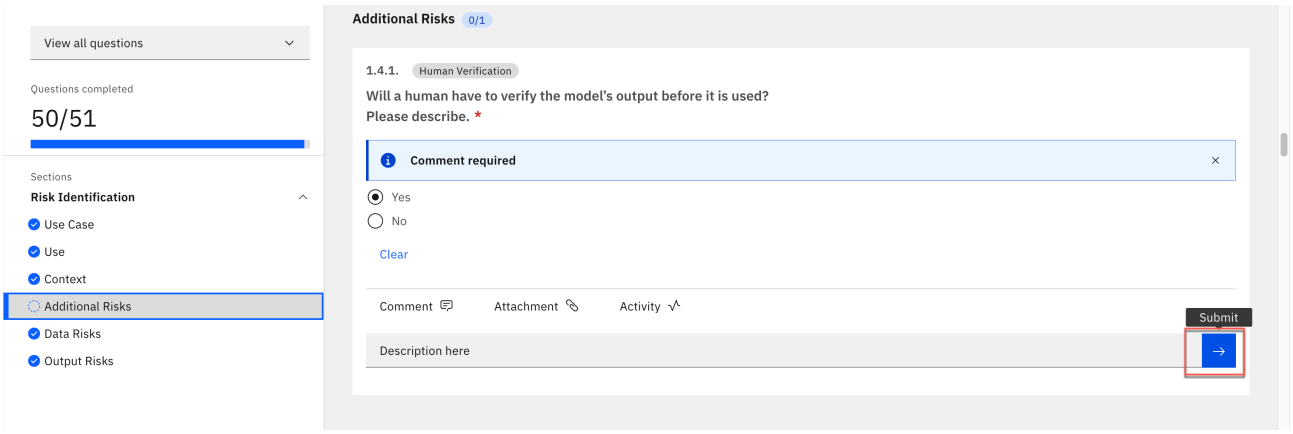
1. Click on the Home tab.
2. Click on the My Tasks tab from the home screen to reopen the view of assigned tasks.
3. Click on the AI Risk Identification ... task from the task list that corresponds to the use case you created. The Risk Identification questionnaire assessment for the use case opens.



4. Fill out the questionnaire for your use case. Your answers should reflect real risks posed by using AI models to address this business issue. For example, when summarizing resumes, input data will be provided by humans, and may contain some sensitive information. Note that the idea of this questionnaire is to identify potential risks in the model use case. Feel free to use short, generic answers when filling out text entry portions of the form such as specifying things like bias mitigation strategies or describing content.

> Note The purpose of this questionnaire is NOT to provide an out-of-the-box solution to identifying client risks. Instead, it is to provide a foundation on which clients or consultants can build their own questionnaires, customized to a particular client. As you progress through the questionnaire, it may be useful to consider other questions that might be relevant for some of your clients. They can easily modify existing forms, or build new ones from scratch using the editor. Also note how additional questions can be added to the form based on answers to other questions.

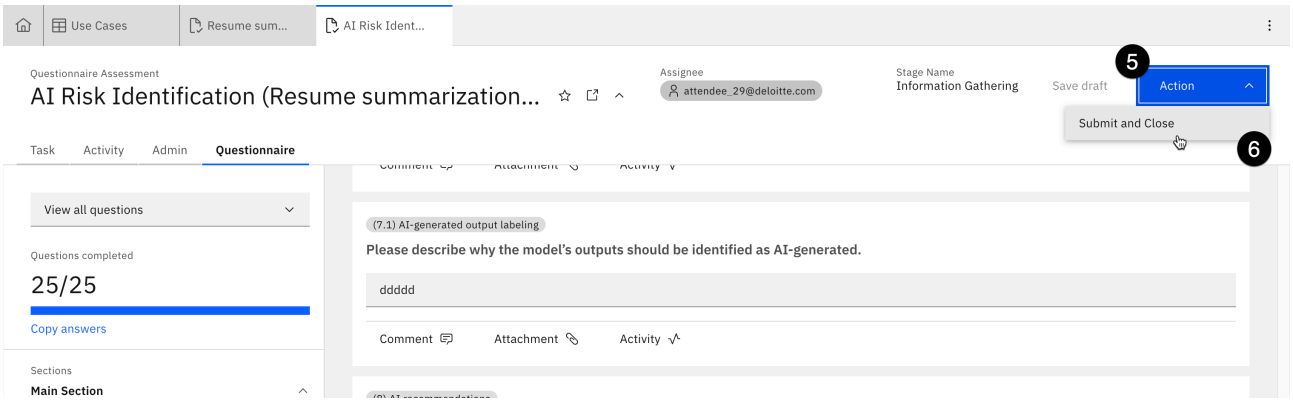
Some of the answers require comments to be added; when adding those comments, you must click on the blue Submit button to the right of the text entry field for the comment to be entered and the question marked as completed.



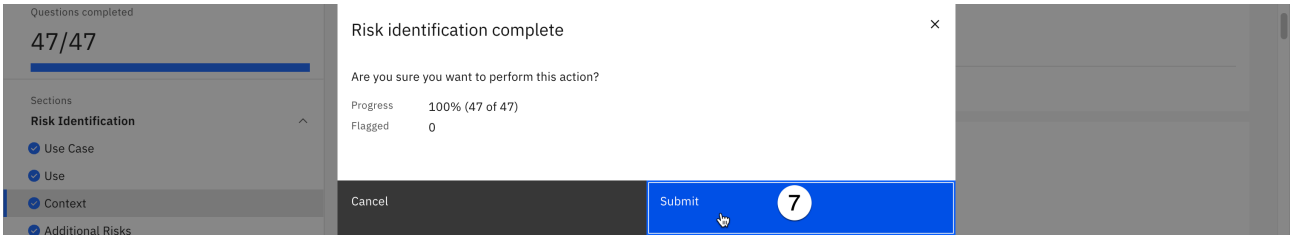
Note the progress panel on the left side of the screen will show any required questions that have not been answered, and you can use it to jump between sections of the questionnaire. Your progress will also be automatically saved as you answer questions.

5. When you have finished filling out the survey, click the Action button in the upper right. The Actions menu opens.

6. Click the Submit and Close button. A confirmation dialog opens.



7. Click Submit to submit the risk identification questionnaire.



8. Based on the questionnaire answers, the governance console now calculates and assigns certain risks to the use case. You can view these by clicking on the Home tab.

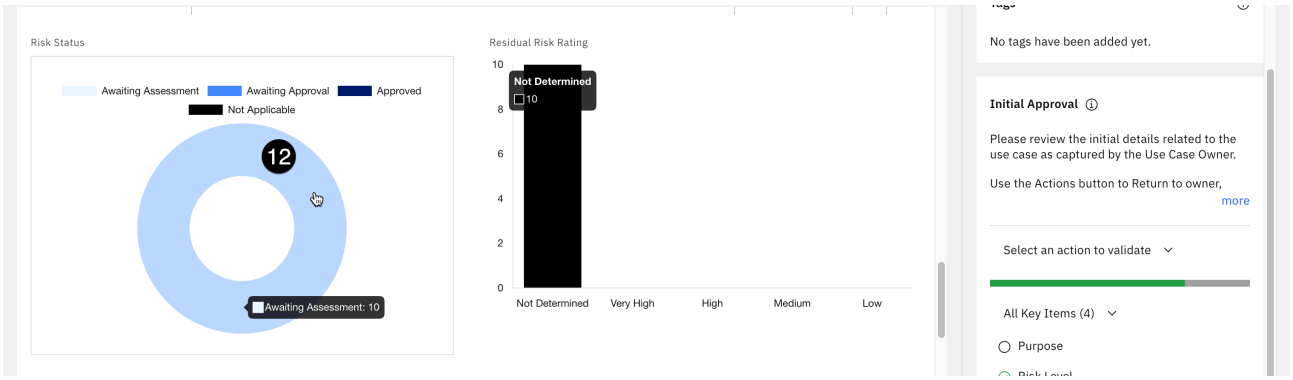
9. Click on the My Tasks tab of the Home tab. The use case appears in the list of tasks, with the stage set to Initial Approval.

10. Click on the use case from the task list. The use case opens in a new tab.

11. Scroll down to the Risk section of the page.

> Note: If you do not see any risks associated with your use case, you may need to refresh the browser window to populate the table.

12. Scroll down to the Risk Status and Residual Risk Rating graphs. Based on your questionnaire answers, your charts may look different from the screenshot. Click on the Risk Status graph. The Risks tab opens.



13. Examine the table of risks. Note that each has a description, and a reference URL for more information. These risks have been populated from the AI risk atlas. They also have a Status of Awaiting assessment, indicating that a risk assessor must decide if they are relevant to the use case or not.

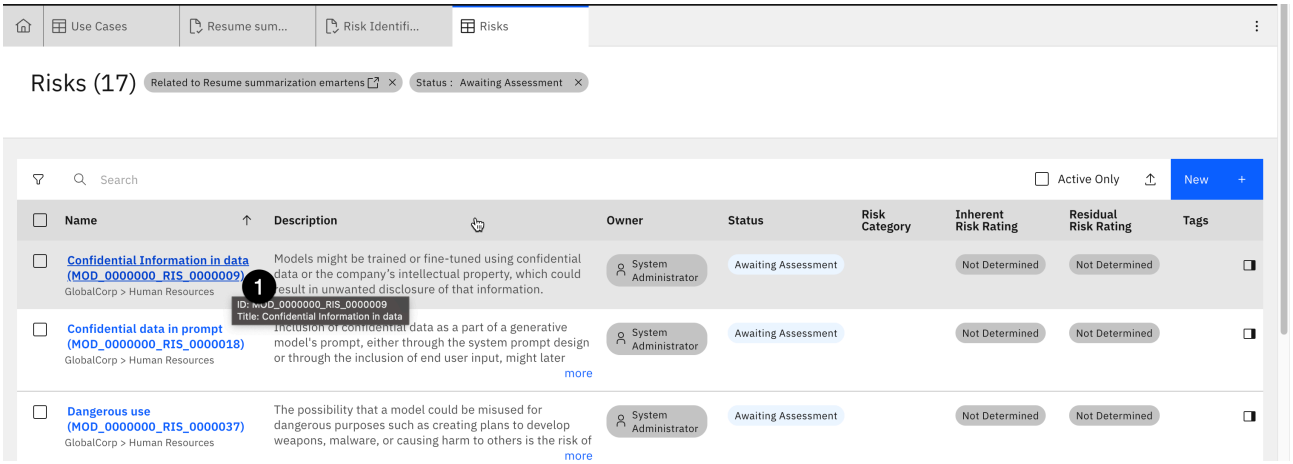
Next, you will assess the individual risks from the role of a risk manager.

8. Assess individual risks

The questionnaires you completed have been constructed to automatically add various risks to the use case, based on the answers provided. Clients looking to use a similar process can use this questionnaire template as a model for creating their own, customized to their individual use cases.

In this section, you will assess individual risks. For the sake of time, you will only perform a single in-depth assessment, to see how this is handled in the governance console.

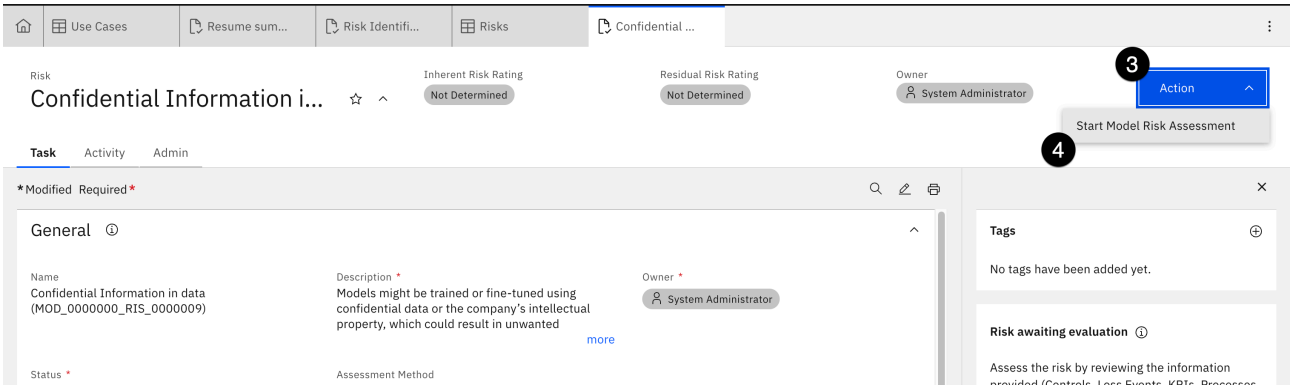
1. The Risks tab for the use case should be open and active on your screen. Choose one of the risks on the table and click on it to open it.



2. Scroll down to the Related Content section of the page, and note that the risk can be associated with mitigating controls, processes, or other issues. Take a moment to inspect some of the other sections on the page, including Internal Audit Risk Rating, and note how risks can be customized based on the threat they pose to a client's business.

3. Click on the Action button in the upper right to open the actions menu.

4. Click on the Start model risk assessment button to begin assessing the risk. A confirmation dialog opens.

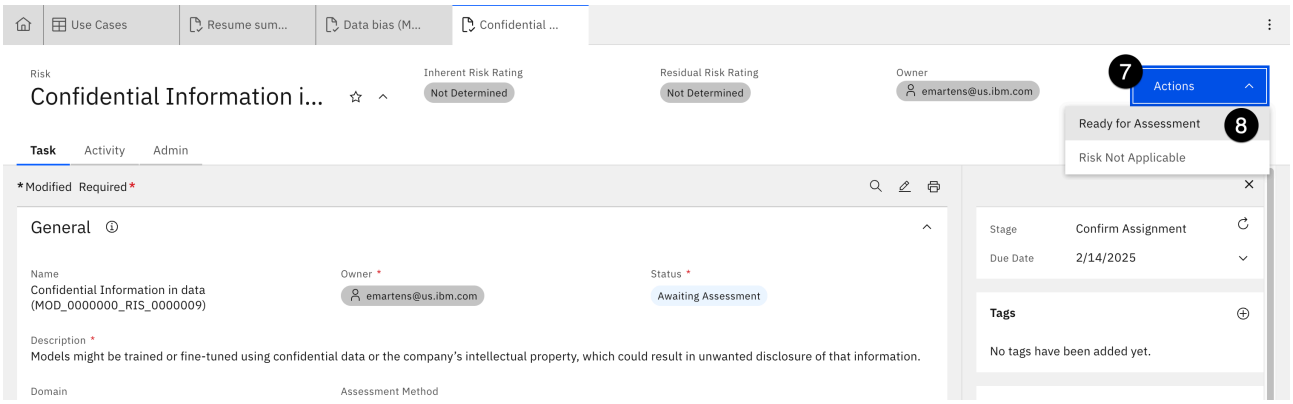


5. Click the Continue button. The risk assessment form opens. If you look at the task list on your home tab, you will also see the assessment there.

Note that you have been marked as the Owner of the risk assessment. In the information panels on the right side of the screen, you will see a Confirm Assignment panel, which asks you to confirm that this assignment is correct. Next, you will need to either mark the risk as ready for assessment, or set it as not applicable to the use case.

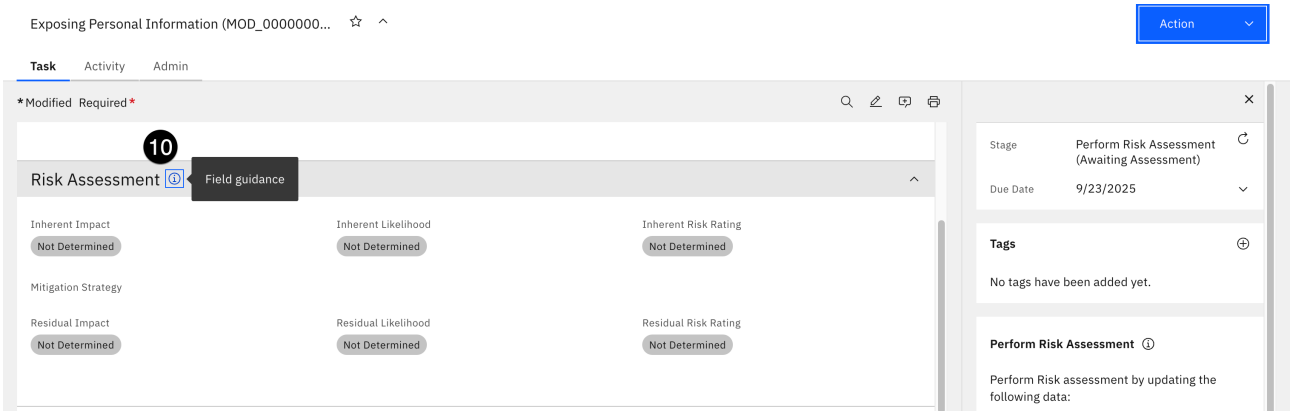
7. Click on the Actions button. The Actions menu opens.

8. Click on the Ready for Assessment menu item. A confirmation dialog opens.



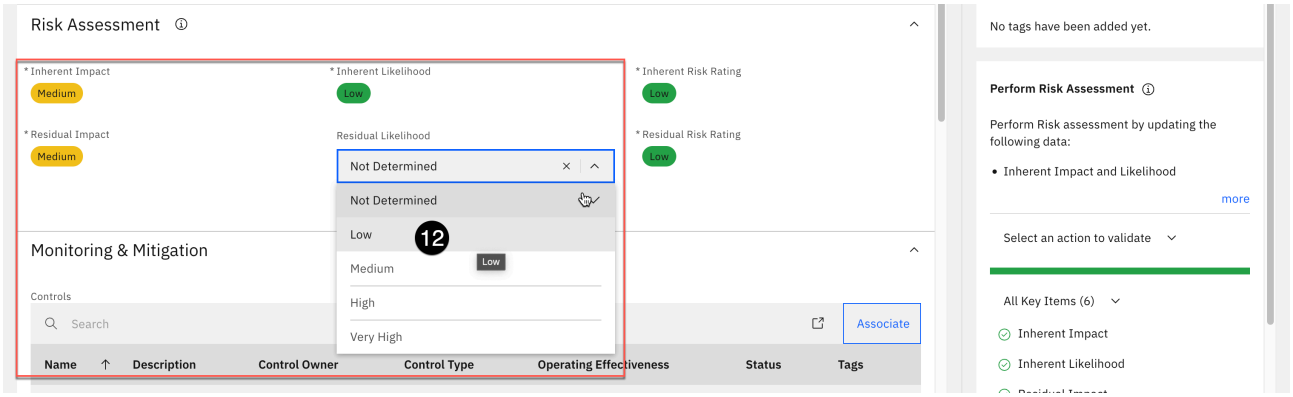
9. Click on the Continue button in the confirmation dialog. The risk assessment form changes to show the assessment values.

10. Scroll down to the Risk Assessment portion of the page and click on the information icon next to the session header to open the Field Guidance window. Take a moment to read the descriptions of what each field represents.



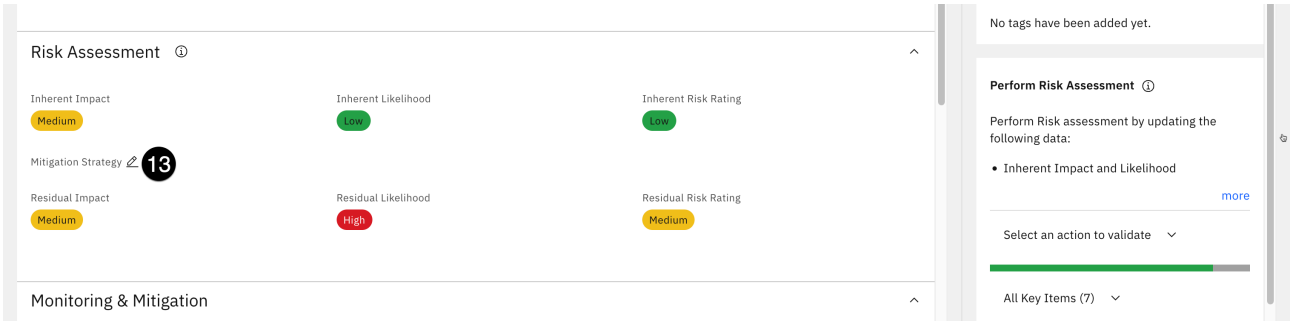
11. Close the Field Guidance window by clicking the X button in the upper right corner of the popup.

12. Click on the edit icon for each field and assign a rating.



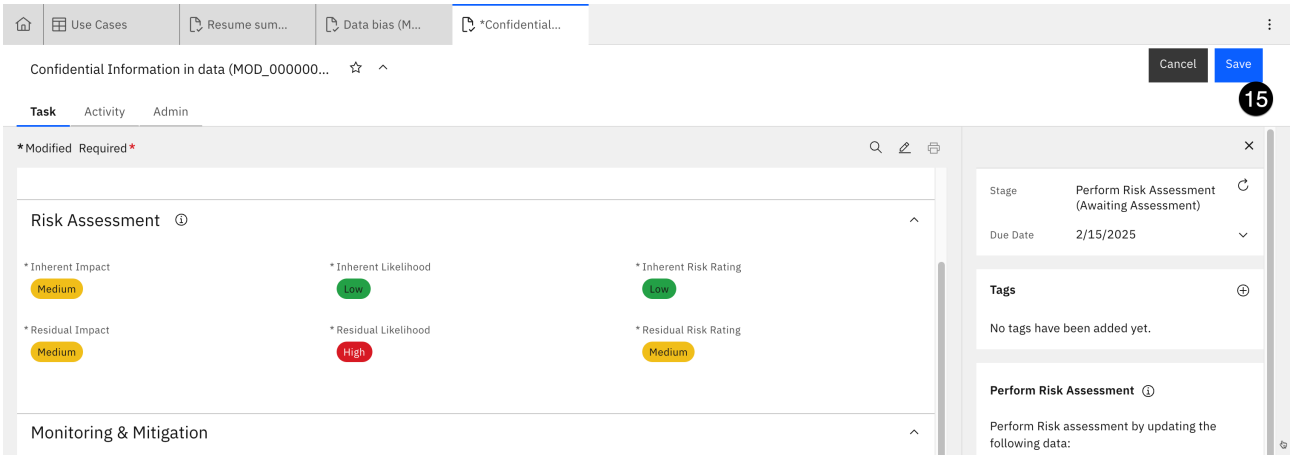
Next, you will need to provide a mitigation strategy for the risk.

13. Locate the Mitigation Strategy field in the Risk Assessment section. Hover your mouse over it and click on the pencil icon to edit it.



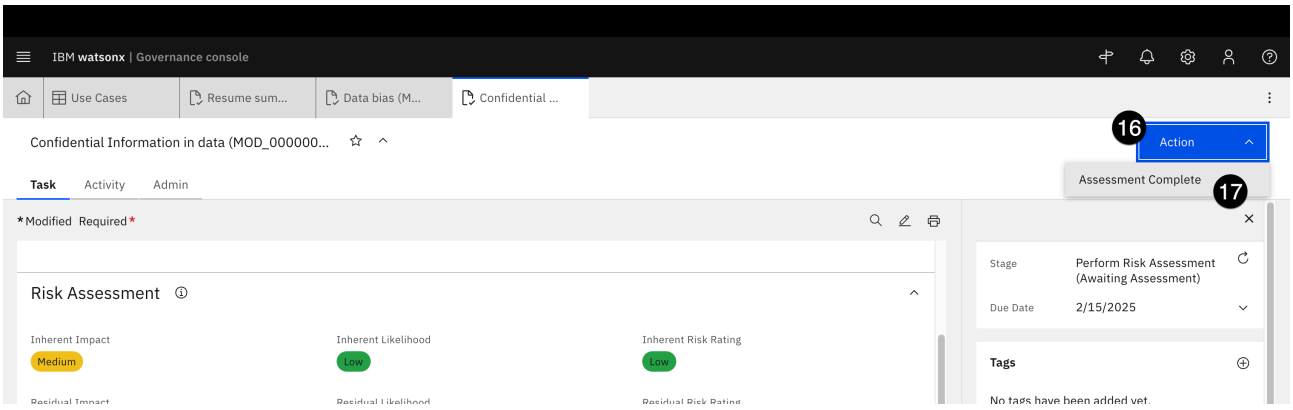
14. Enter a strategy in the text field for dealing with the risk. For example, for a *Confidential information in data* risk for a resume summarization use case, a strategy could involve masking or obfuscating sensitive info using watsonx.data.

15. Click the Save button to save your changes.



16. Click on the Action button in the upper right to open the actions menu.

17. Click on the Assessment Complete button to finish the risk assessment.



18. When asked to confirm your choice, click on the Continue and close tab button.

19. Return to the use case view, either by clicking on the tab or locating it from the My tasks section of your Home tab.

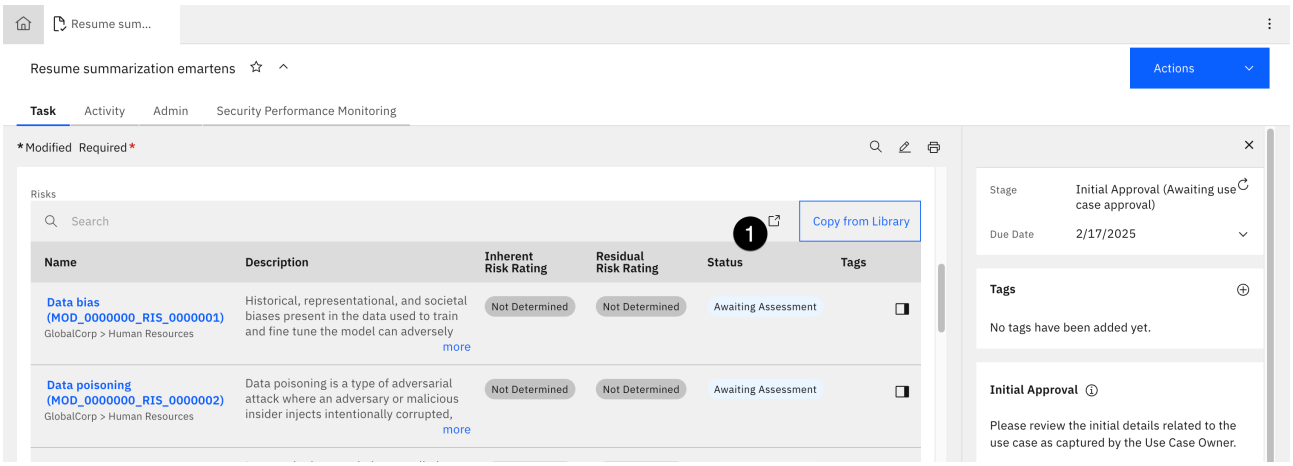
20. Scroll down to the Risks section, and note that the Inherent Risk Rating, Residual Risk Rating, and Status have been updated in the table.

You may repeat this process for as many of the risks as you wish before proceeding. For the sake of brevity, the next steps show you how to change the status of multiple risks at once.

9. Assess multiple risks

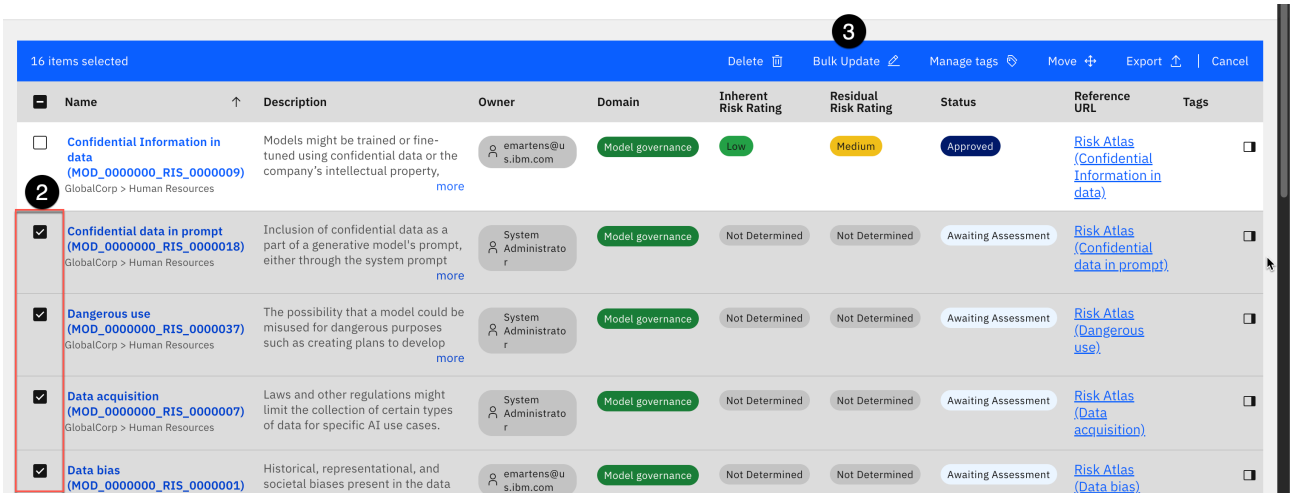
The defined workflow for use case requests dictates that the use case cannot pass to the next phase until all the associated risks have been assessed.

1. Click on the Launch Grid page button at the top of the Risks table. The grid page opens.

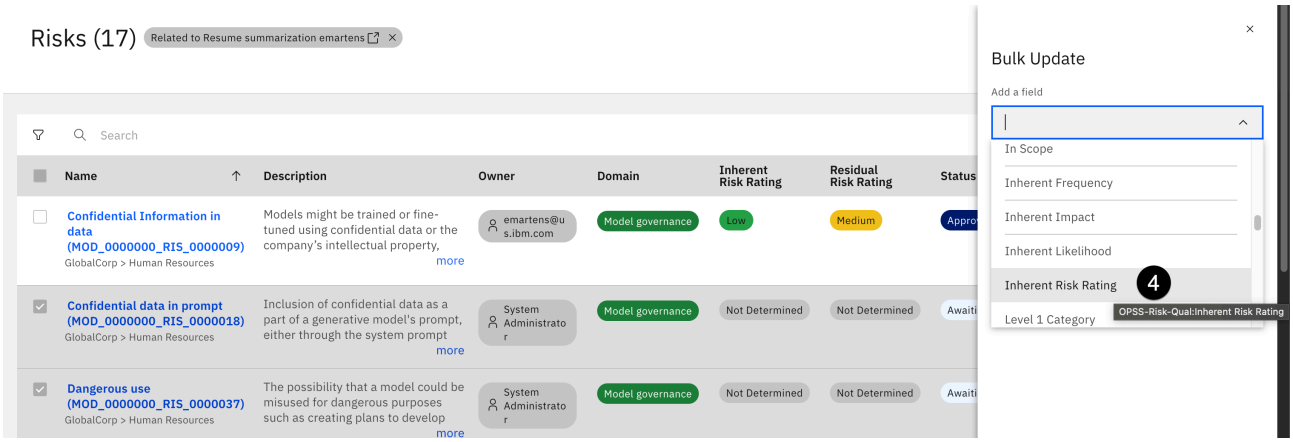


2. Check the box to the left of all the risks still marked with the Awaiting Assessment status. Note that you may need to scroll the window to check them all.

3. Click the Bulk Update button at the top of the table. The Bulk Update panel opens.

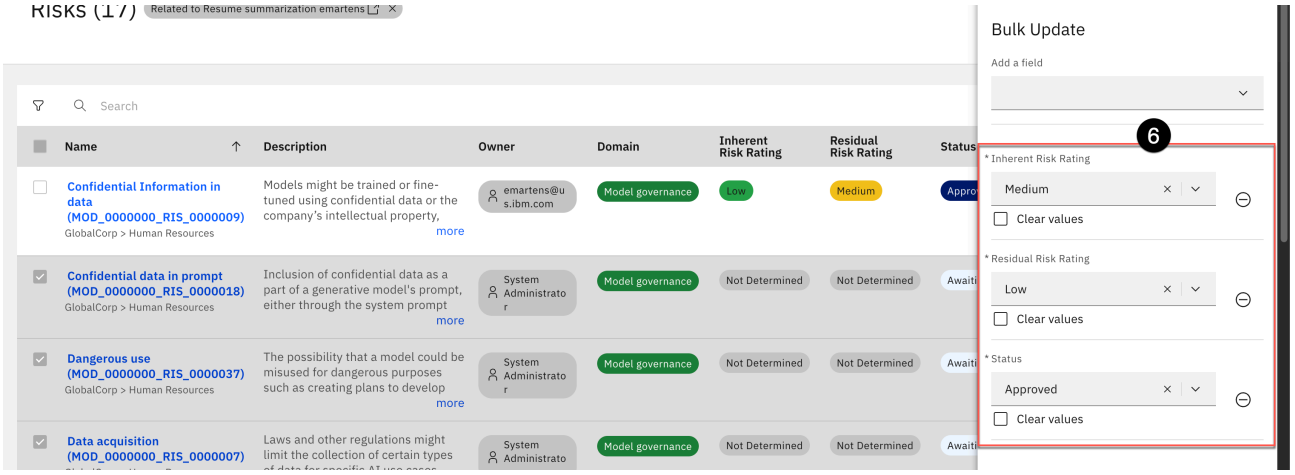


4. Click on the Add a field dropdown and select the Inherent Risk Rating item from the list. A dropdown for Inherent Risk Rating appears in the panel.



5. Repeat the previous step to add Residual Risk Rating and Status to the panel.

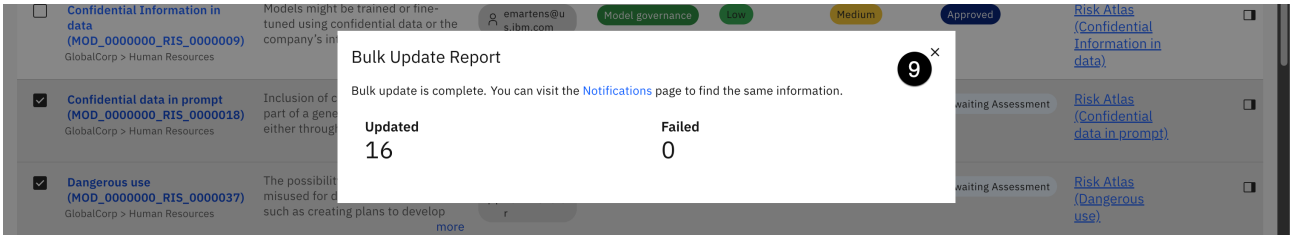
6. Click on the dropdowns and select risk ratings and a status. Note that to progress the use case, you must select either Approved or Not Applicable in the Status dropdown.



7. Click the Update button at the bottom of the panel.

8. When asked to confirm your bulk update, click the Confirm button. The update will run, and may take a few minutes to complete depending on how many risks were updated.

9. When the update completes, click the X button to close the Bulk Update Report popup. The Risks table will refresh, showing the new values.



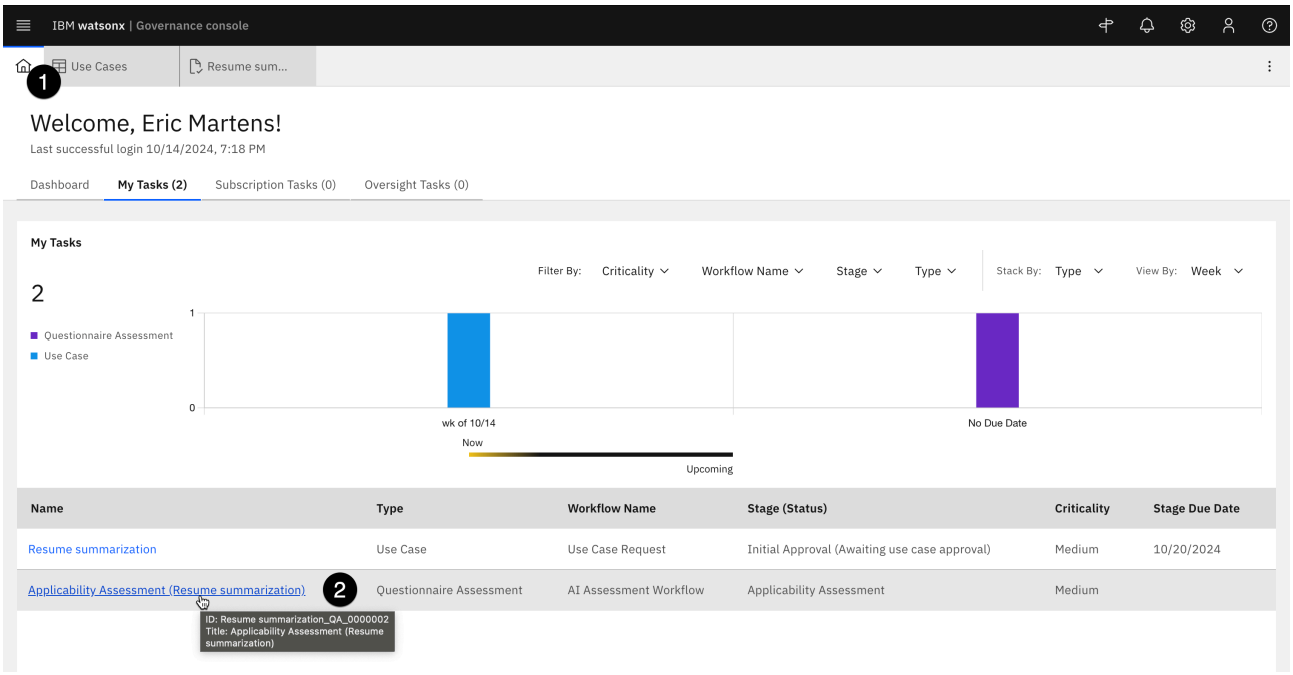
The risk assessments are now complete. You can progress the use case to the next phase.

10. Assess applicability for the use case

In this step, fill out the applicability assessment questionnaire. As with the previous questionnaire, this form is provided by IBM, but can be fully customized by clients to fit their own needs. It is modeled after some of the requirements set forth in legislation around AI in the European Union.

1. Click on the Home tab to switch to it. The tab should still be showing the My Tasks view.

2. Locate and click on the Applicability Assessment link from the tasks table. THe Applicability Assessment Questionnaire opens in a new tab.

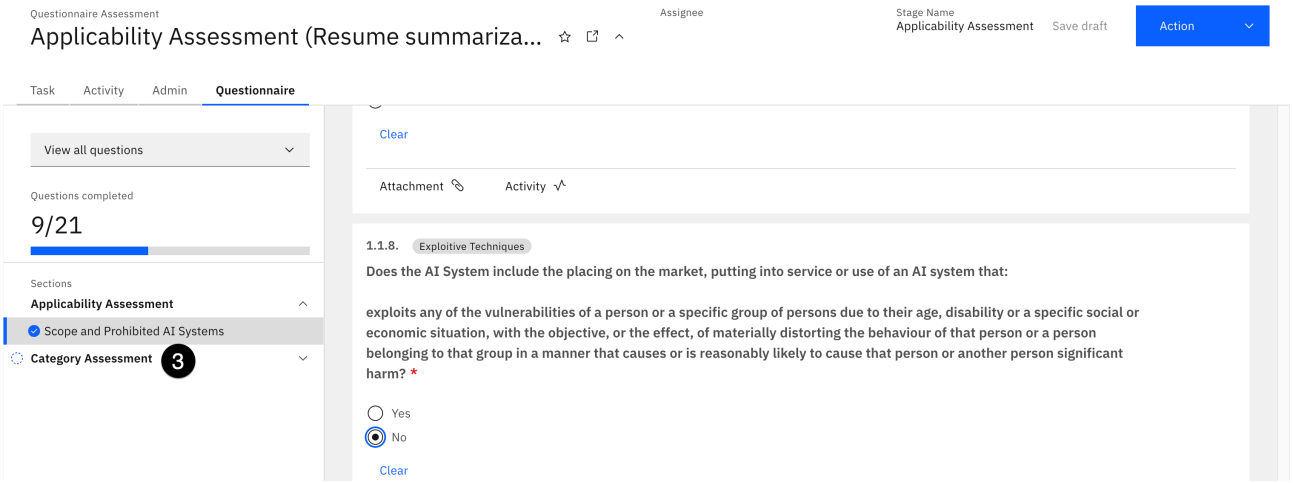


Take a moment to skim the text for each of the questions, and understand how potentially clients might answer them and how it affects their risk profile for adopting AI tools.

After the third question, the questionnaire will add extra questions based on your answers. Continue to fill out the questions for the resume summarization use case, taking into account whether the model will perform classification, facial or image recognition, biometric data, individual risk assessments, or other potentially harmful acts.

When you have completed the questions, the Category Assessment section of the form will populate.

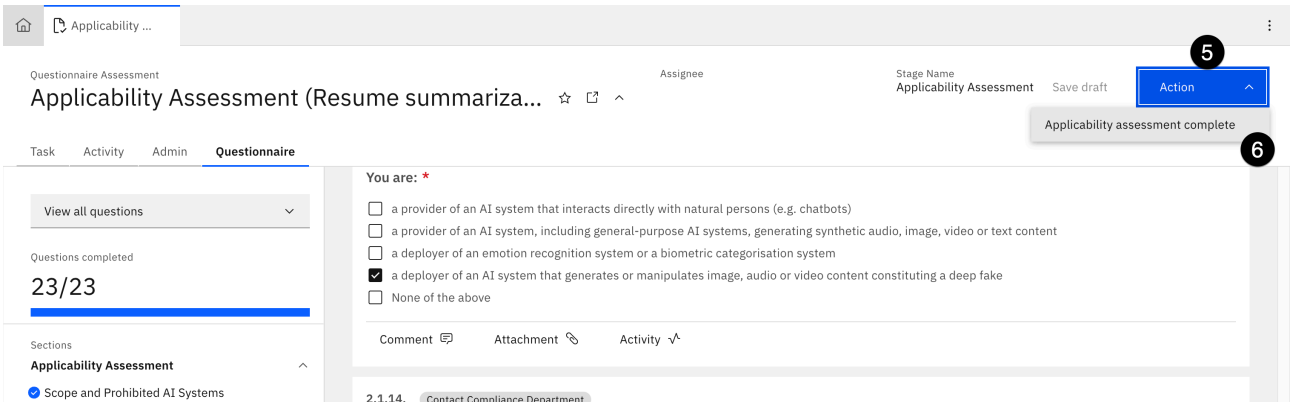
3. Click on the Category Assessment section to view it.



4. Continue to fill out the questions in the questionnaire for your use case.

5. When you have finished answering all the questions, click on the Action button to open the actions menu.

6. Click on the Applicability assessment complete menu item.



7. Click on the Submit button to confirm your choice. Your action may take a few moments to save, and the screen may not update. However, you may proceed with the lab.

You have now completed two assessments regarding the model use case, which have been used to both automatically identify possible risks associated with using AI and helped insure regulatory compliance. Next, you will approve the use case for development.

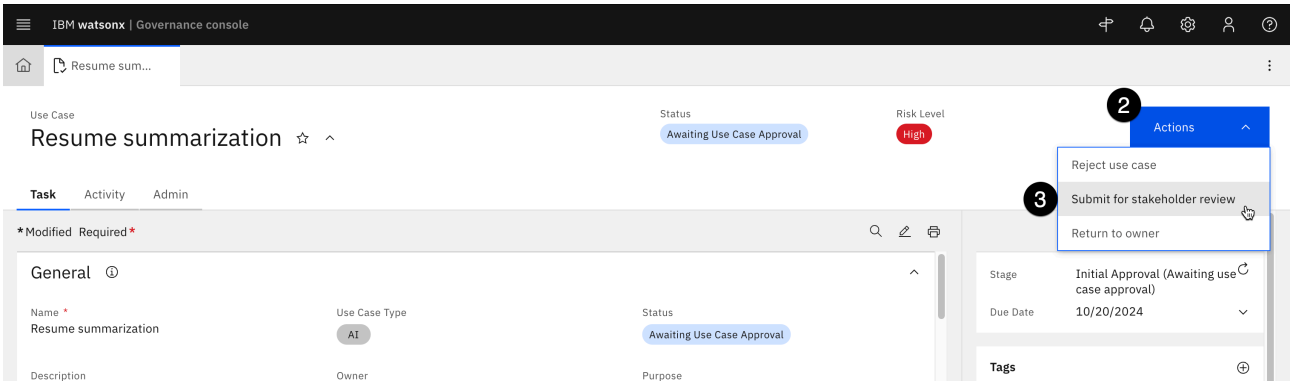
11. Approve the use case for development

Now that the risks have been identified and assessed, the use case can be approved for the next stage of the lifecycle.

1. Return to the use case view, either by clicking on the tab or locating it from the My tasks section of your Home tab.

2. The use case is now ready to be progressed to the next stage of the workflow. Click on the Actions button in the upper right. The Actions menu opens.

3. Click on the Submit for stakeholder review menu option. A confirmation dialog opens.

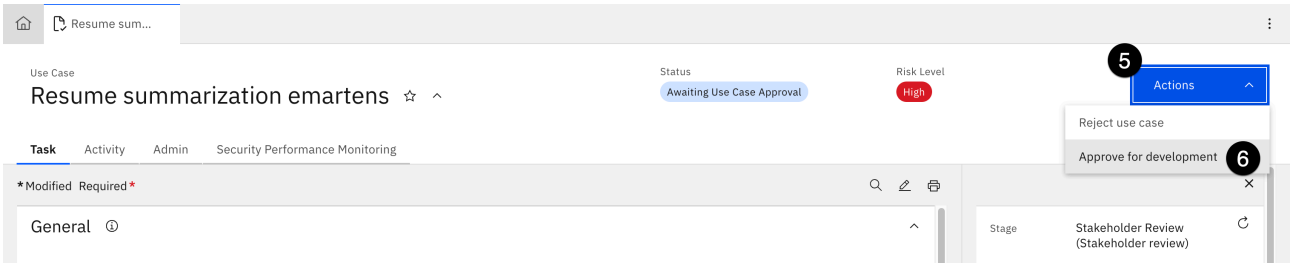


4. Click on the Continue button to confirm your choice. The use case progresses to the Stakeholder Review stage.

At this point in the process, the model risk department would review the use case, including the answers provided in the risk identification questionnaire. Other stakeholders would also review the use case to ensure that all requirements were being met. Note that a link to the questionnaire have been provided in the Risk section of the page, for easy access. Also note that the bar chart of the risks has been updated to reflect their assessments.

5. Click on the Actions button once more. The Actions menu opens.

6. Click on the Approve for development menu item to approve the use case. A confirmation dialog opens.



12. Click the Continue button to confirm your choice. The Status field changes to Approved for Development.

At this point in the lifecycle, the model use case has been created, reviewed for risks, and approved by the various stakeholders. Personas involved are mostly non-technical, from the business user who requested the model to the risk and compliance officer who evaluated it. Next, the model would be developed by teams of data scientists and AI engineers.

The model development steps have their own associated workflows and requirements. For the next part of the lab, you will see how controls can be identified and associated with model risks. You will then examine a model that is under development, to get a closer look at the metrics gathering capabilities of watsonx.governance.

Controls identification and implementation

Controls are policies and procedures that make sure that risk mitigation responses are performed.

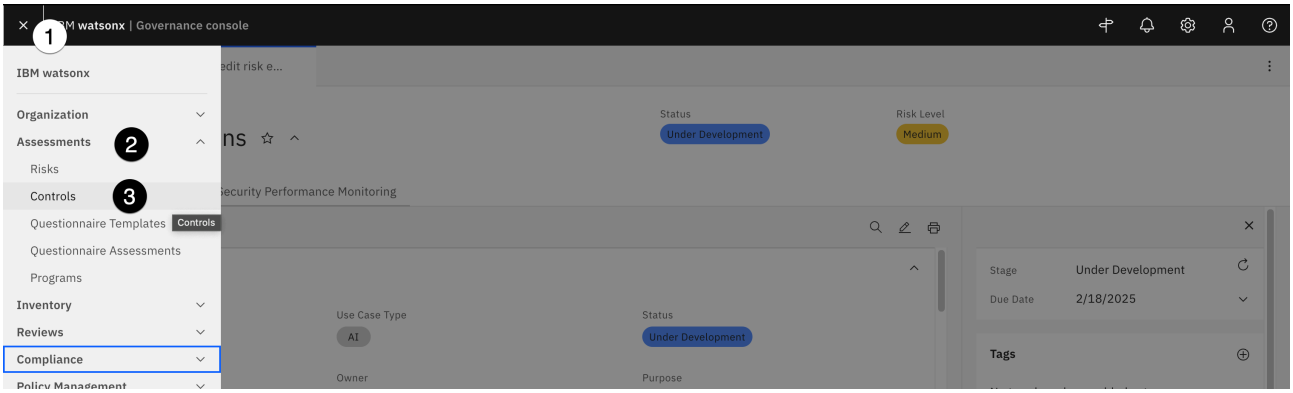
After you identify the risks that occur in your practices, establish controls, such as approvals, authorizations, and verifications. These controls remove, limit, or transfer these risks.

Controls provide either prevention or detection of risks. Controls are associated with tests that ensure that a control is effective. For example, AI models trained with unfairly biased training data frequently exhibit the same unfair bias during their operation.

1. View the controls the inventory

Controls are treated as objects in the governance console, and contained in the inventory with questionnaires and assessments.

1. Click on the menu button in the upper left to open the menu.
2. Click on the Assessments menu item to expand it.
3. Click on the Controls menu item. The Controls tab opens.



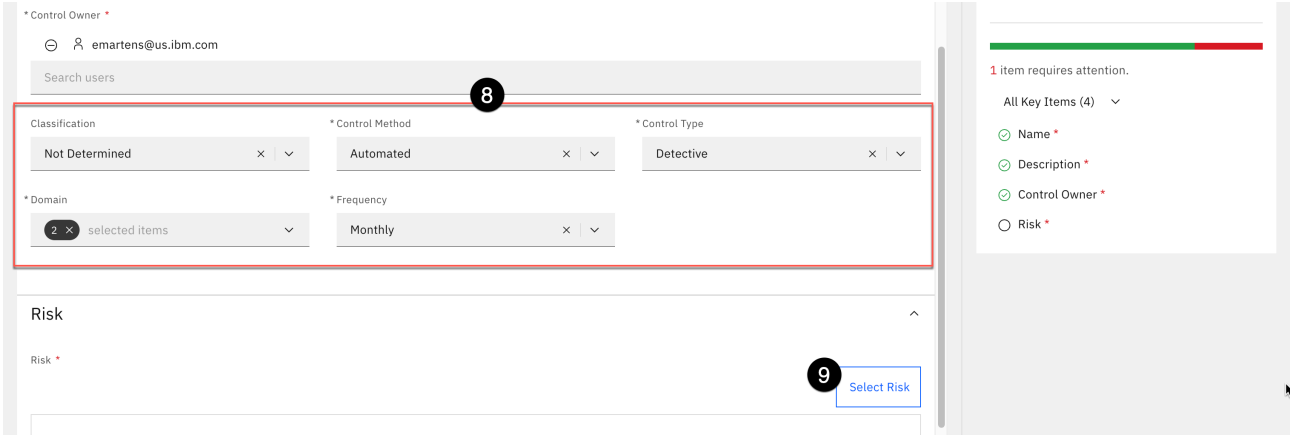
Two sample controls have been created in the environment:

- Screen training data for unfair bias
- Audit data security

Next, you will go through the process of creating a new control similar to the two sample controls. You do not need to save your control or provide any specific details in the form.

4. Click on the New button to create a new control. The New Control tab opens.
5. Give your control a name such as *Sample Control*.
6. Set the Status of the control to Approved.
7. Set the Control Owner to your user ID.

8. Take a moment to explore and set the values available for Classification, Control Method, Control Type, Domain, and Frequency.
9. Click on the Select Risk button. The risk selection dialog window opens.



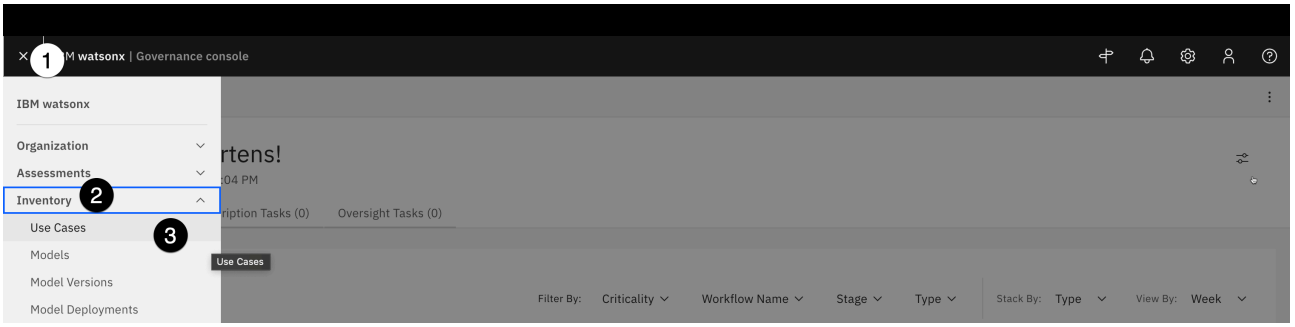
Note that the list of risks available in the dialog has been populated from the risks identified earlier in the use cases, or in the master risk library. You can use this screen to assign your control as a process to mitigate a potential risk.

10. When you are finished exploring, either click on a risk to select it and click the Done button, or click the Cancel button.
11. Click on the Cancel button to close the tab and return to the list of controls. Alternately, you can click on the Save button to save your new control.

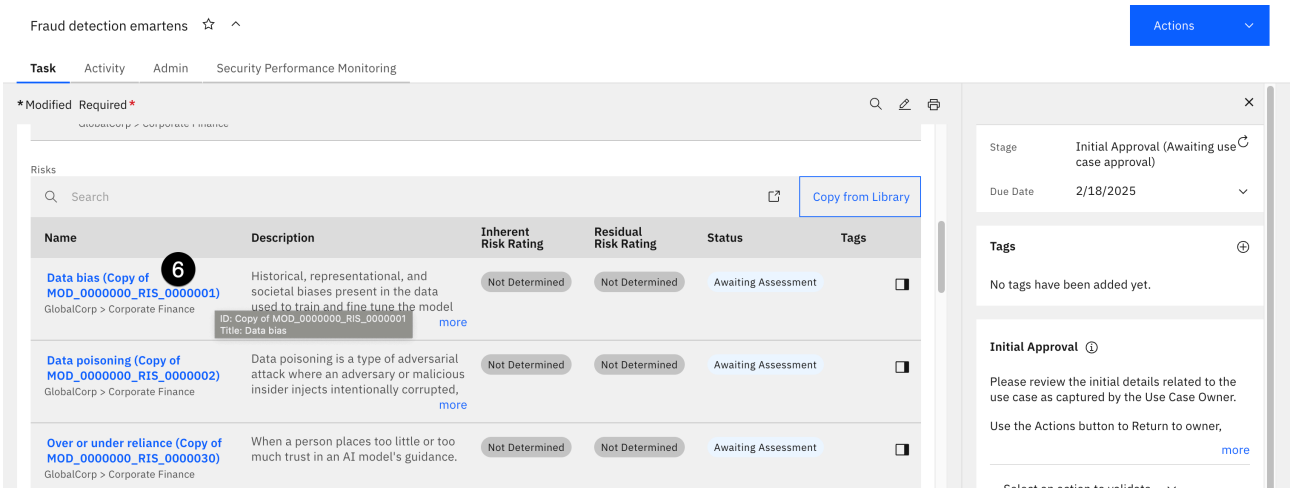
2. See controls associated with risks

Next, you will explore a control that has been associated with a risk in a use case.

1. Click on the menu button in the upper left.
2. Click on the Inventory menu item to expand it.
3. Click on the Use Cases menu item. The Use Cases tab opens.



4. Locate the Credit risk emartens use case from the list and click on it. The use case details screen opens.
5. Scroll down to the Risk section of the use case and locate the Risk table containing all of the identified risks.
6. Locate the Data bias risk and click on it. The risk details tab opens.



7. Scroll down to the Related Content section of the screen, and note that the Mitigating Controls tab contains a table with one control.
8. Click on the control in the table. The control information tab opens.

At this point, you could kick off an assessment of the control to verify that it was being performed to mitigate the risk. You have now seen how mitigating controls can be defined by an organization, and associated with risks that they are meant to mitigate. You then saw how those controls can be attached to use cases to ensure that stakeholders are taking the required steps to mitigate the risks.

The governance console gives clients the flexibility to make these controls part of approval workflows, and to build reports and metrics based on the completion of the controls.

In the next section, you will explore how watsonx.governance can evaluate and monitor AI and machine learning models.

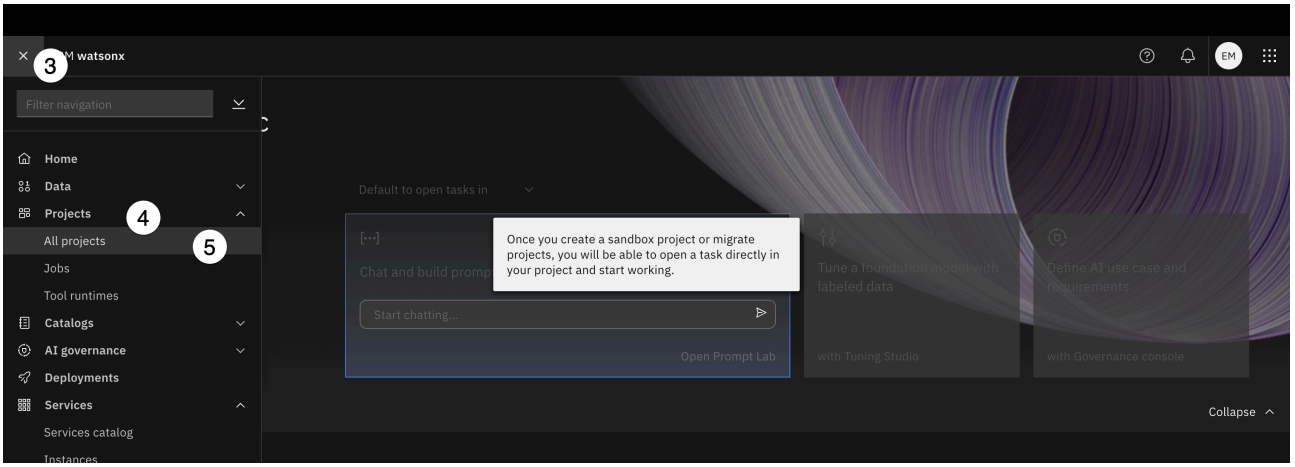
Monitoring and issue management

In this section, you will explore the various metrics automatically gathered by the watsonx.governance solution. You will work with a project in the watsonx development environment, from the point of view of a model developer or AI engineer. However, the same functionality is available for models developed and deployed in third-party platforms such as Microsoft Azure or AWS SageMaker.

1. Explore the development environment

1. Click on the menu icon in the upper left.
2. Click on the IBM watsonx menu item. You will return to the watsonx home screen.

3. From the watsonx home screen, click on the menu icon in the upper left to open the menu.
4. Click on the Projects menu item to expand it.
5. Click on the All projects menu item. The Projects screen opens.



6. Locate the Credit risk development project from the list and click on it. The project details screen opens.

IBM watsonx uses projects to allow data scientists, data engineers, and subject-matter experts to collaborate on data science projects. They can contain a huge variety of assets, including (but not limited to):

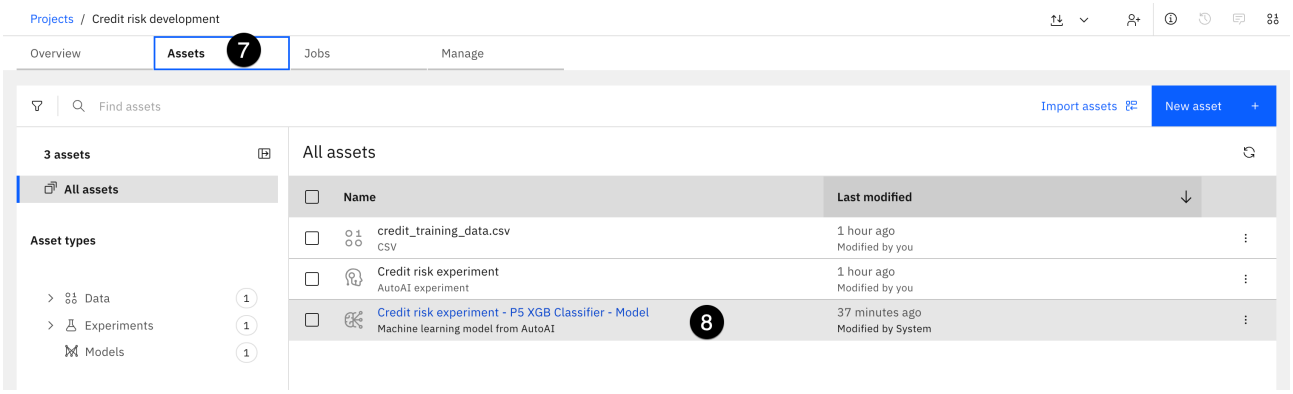
- Machine learning models
- AI prompt templates
- Jupyter notebooks
- Database connections
- AutoAI experiments
- SPSS Modeler flows

7. Click on the Assets tab of the project.

This particular project contains a comma-separated value (CSV) file of data that has been used to train a credit risk model with AutoAI, IBM's auto-machine learning tool for rapid model prototyping. The AutoAI

experiment is also contained in the project, as is the output model.

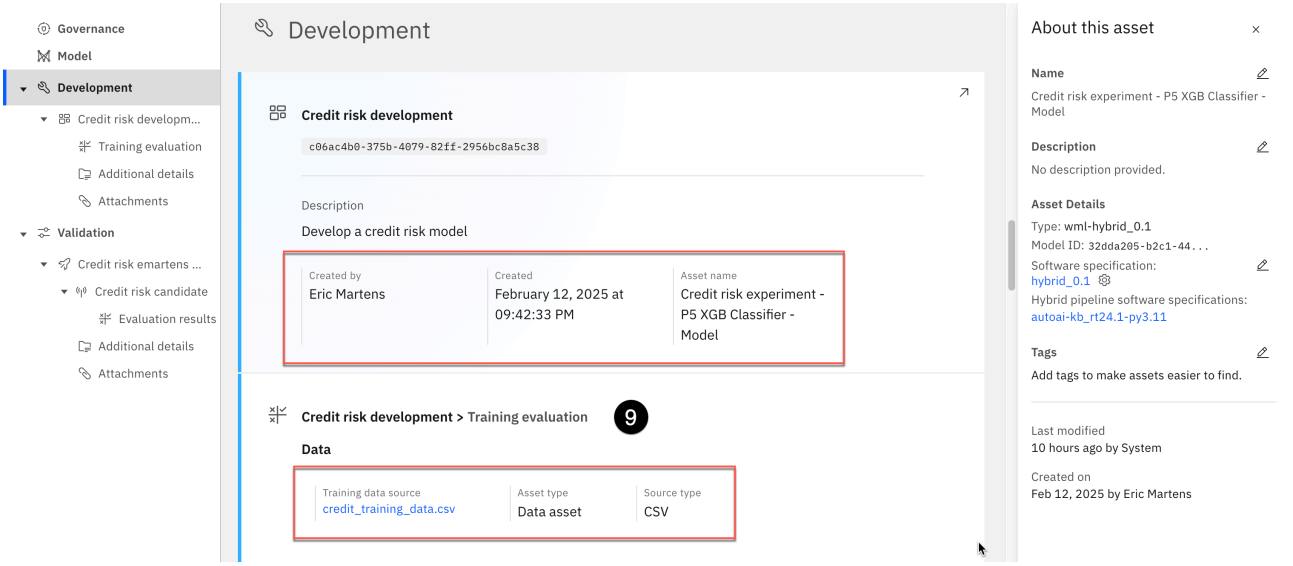
8. Click on the Credit risk experiment - P5 XGB Classifier - Model. The model factsheet opens.



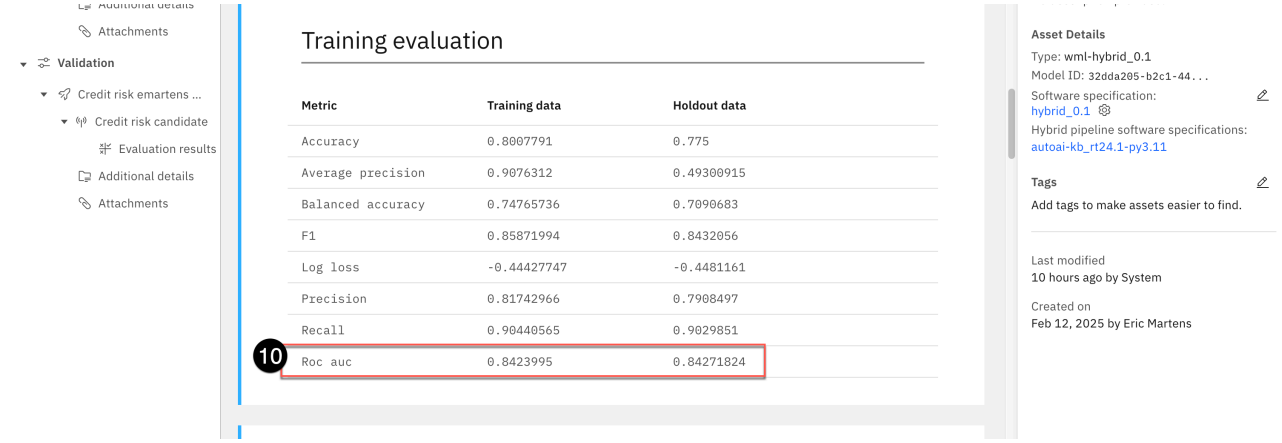
Model factsheets collect all the relevant data around a particular model, including both evaluation metrics and metadata. Factsheets are created when the model developer initiates model tracking. In the day 2 lab you will receive hands-on experience with this process. For now, understand that when you turn on tracking for the model, you associate it with an AI use case like the ones you created earlier in this lab.

In a real workflow, the stakeholders would create a use case request, and go through the AI use case request process that you completed earlier. Recall that at the end of that process, you approved the model for development. At that point, data scientists and AI engineers would begin developing the model using tools like the watsonx project, prompt lab, or similar tools from Azure, AWS, or other vendors.

9. Scroll down to the Development section, or use the quick links in the left-hand navigation. Take a moment to review the captured metadata, including the model author and link to the data used to train the model.



10. Scroll down further to the Training evaluation section of the page, and note that quality metrics data generated by AutoAI during the creation of the model has been saved in the factsheet. These metrics represent the ones calculated using holdout data during model creation. In particular, note the Roc auc score of 0.84.



Area under ROC is a standard measurement of quality for classification models, particularly binary classification models such as this credit risk example.

11. Finally, note that you can add attachments to the factsheet. These could include additional requirements, reviews, training data information, or any other details that should be associated with the model.

Next section, you will take a closer look at some of the metrics that have been calculated by the monitoring service.

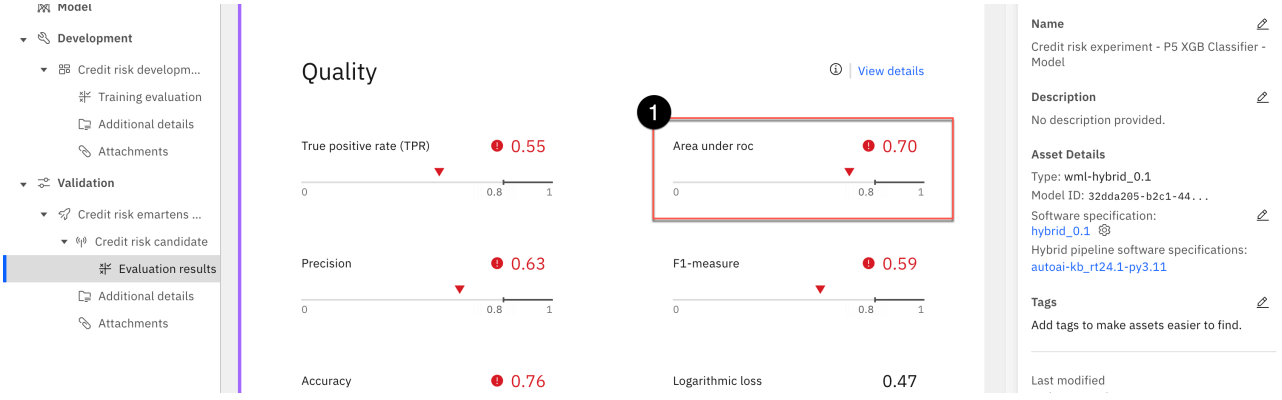
2. Examine metrics from the monitors

In this section, you will look at metrics for the model. Depending on regulations, risks, and model types, different metrics such as quality and fairness will have different thresholds they must meet to remain in compliance. These thresholds can be configured at the model deployment level, allowing organizations to fully customize their metrics reporting and compliance safeguards.

For example, a global company may have one copy of their credit risk model deployed in the United States, where it needs to meet a fairness threshold of 80%. They could then deploy a second copy of the same model in a different region that had a different fairness threshold, and configure monitoring for each model to generate alerts if the fairness dropped below the threshold in that region.

The monitors for this model have already been configured, and an evaluation has been run. Again, in the day 2 lab, you will get an opportunity to perform this configuration.

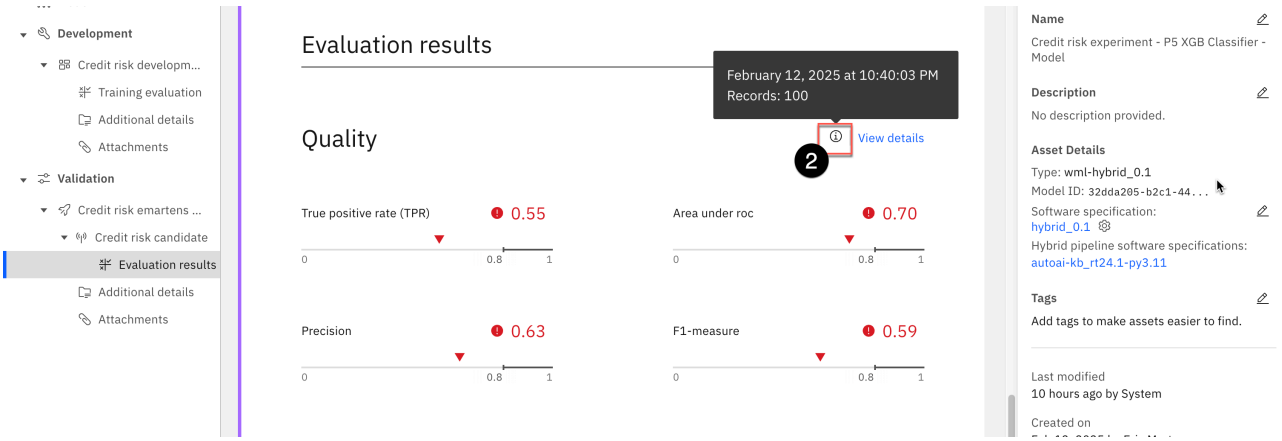
1. Use the left-hand navigation or scroll down to the Evaluation results section of the factsheet, and examine the Area under roc metric.



As you can see from the chart, the minimum threshold for this measurement has been set to 0.8; however, in the most recent evaluation, the model scored 0.70, meaning that the threshold has been violated. The metric shows in red with an alert badge to note the violation. This score is lower than the score calculated

when training the model (0.84), showing that the evaluation data set was somewhat different than the holdout data used to train the model.

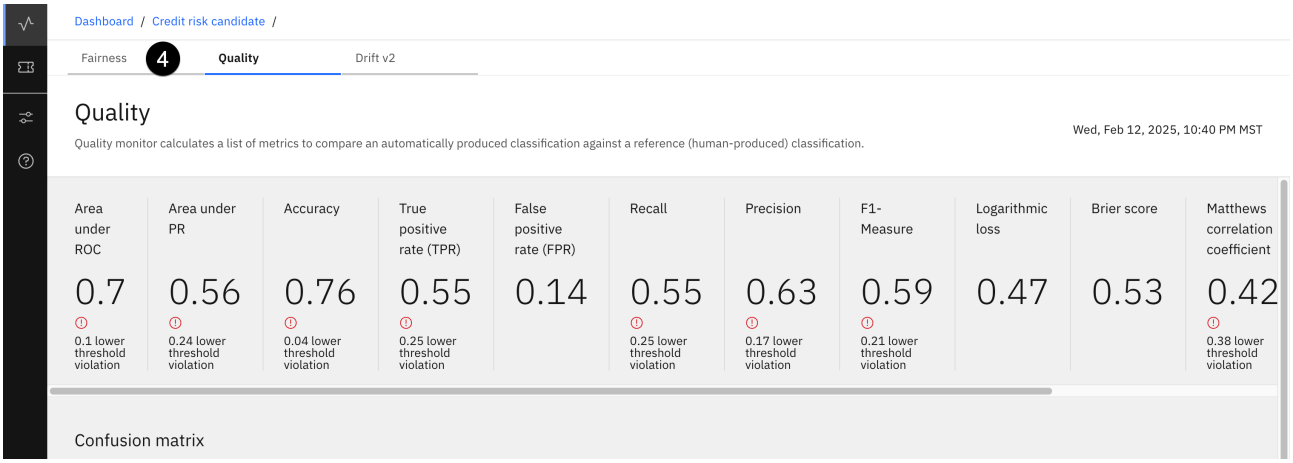
2. Hover your mouse over the information icon in the Quality section to see extra information about the evaluation.



Note that the evaluation only used 100 records, which is a fairly small sample size. A data scientist might recommend a new evaluation with more data to see how that affects the metrics before trying to retrain the model.

3. Click on the View details link to the right of the information icon. A new browser tab opens into the monitoring service (formerly Watson OpenScale) dashboard. This dashboard offers more in-depth information on the various quality metrics, including a confusion matrix.

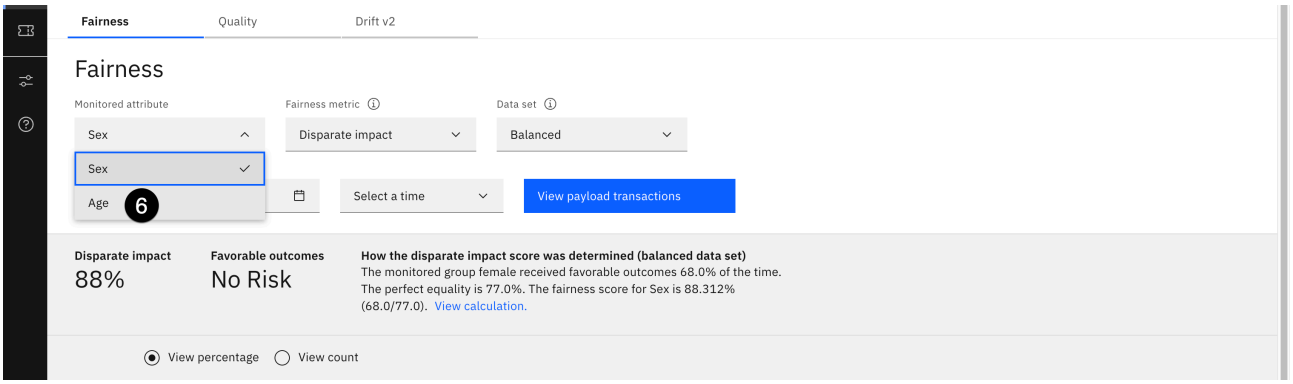
4. Click on the Fairness tab in the dashboard. The Fairness evaluation screen opens.



The administrator has chose to monitor two different variables for fairness in this example: sex and age. The disparate impact calculation has been used to calculate fairness. Again, thresholds for acceptable fairness can be set for each deployment of the model, allowing organizations to maintain compliance wherever they do business.

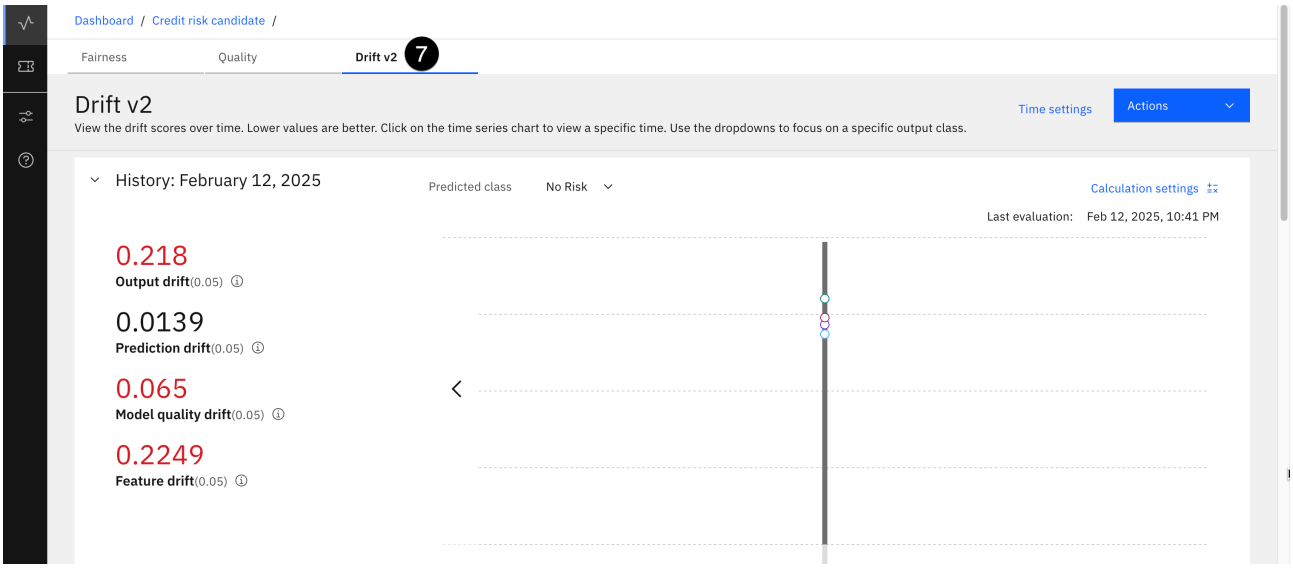
5. Take a moment to review the details on the Fairness screen. You can click on the View calculation link to see how disparate impact is calculated, or toggle between a percentage of positive outcomes and the raw number of positive and negative outcomes.

6. Click on the Monitored attribute dropdown and select Age. The graph changes to show the fairness metric for the *age* feature, which is also within acceptable limits.



Note that, in most cases, age and sex would not be features of a model, as that would increase the chance of unfair bias. The watsonx.governance solution allows for indirect bias monitoring, where the data is submitted with the model records as metadata, and not actually sent to the model for evaluation. In this way, organizations can monitor for unfair bias without possibly introducing it into their models.

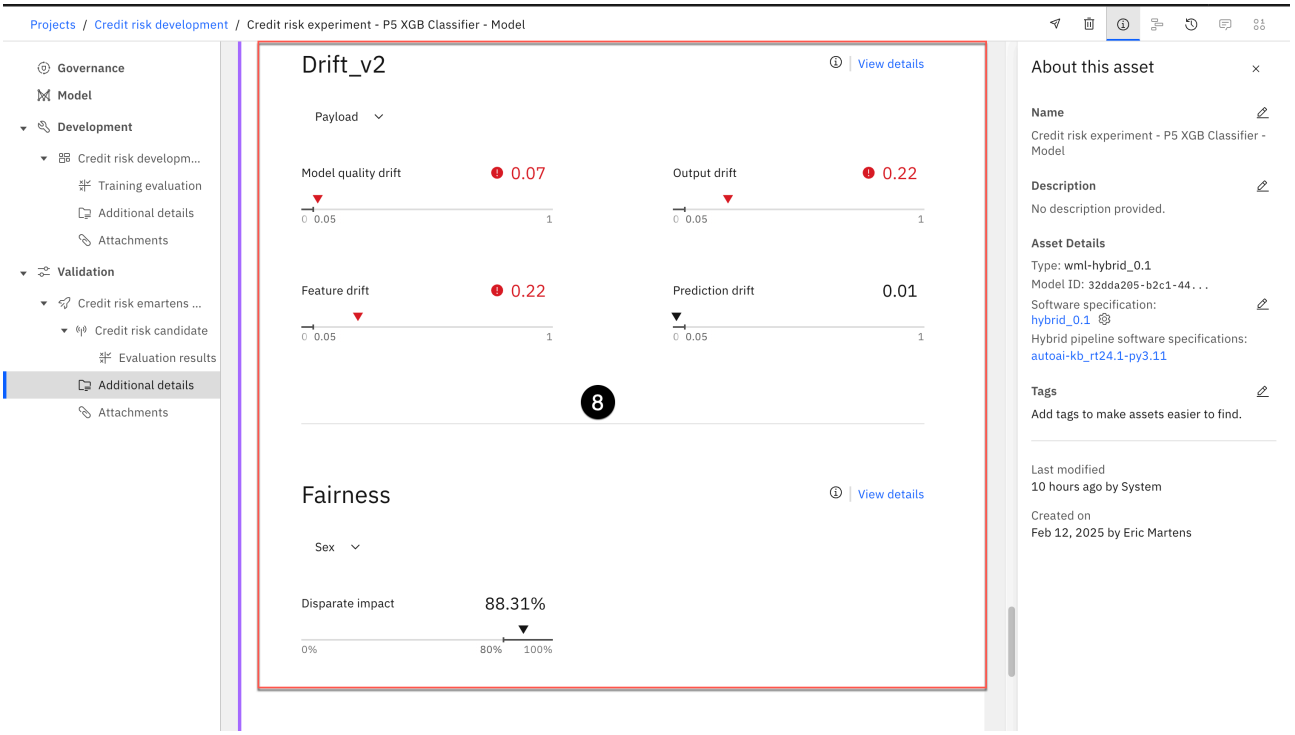
7. Click on the Drift v2 tab. The drift metrics appear.



Drift is a measurement of how changes in data over time affect model accuracy. For example, models that predict demand for toilet paper and sanitizing wipes may have been accurate in January 2020, but radically increased demand brought on by the Covid-19 pandemic was not anticipated, and immediately impacted the model's quality. Not all cases are this extreme; construction of a new factory in a small town would slowly bring more people to the area, driving up demand for housing, schooling, and other goods and services, and affecting any models trying to make predictions about that demand.

An in-depth discussion of drift is beyond the scope of this lab. Know that watsonx.governance can monitor drift continuously for models in production, allowing stakeholders to see and react to quality issues like the ones described above in real time without the need for gathering additional feedback data to take quality metrics.

8. Return to the browser tab showing the model factsheet, and scroll down in the Evaluation results section to the Drift_v2 and Fairness sections.



Note that the same metrics you viewed in the monitoring service dashboard are available here, with slightly less detail, as this view is meant to be more of an overview of the metrics.

In this section, you explored the different metrics available to AI engineers and model developers. These metrics can be calculated on models in development, as well as continuously monitored for models in production deployment. Furthermore, customizable metrics thresholds allow organizations to ensure that all of their models are in compliance with regulatory and industry standards.

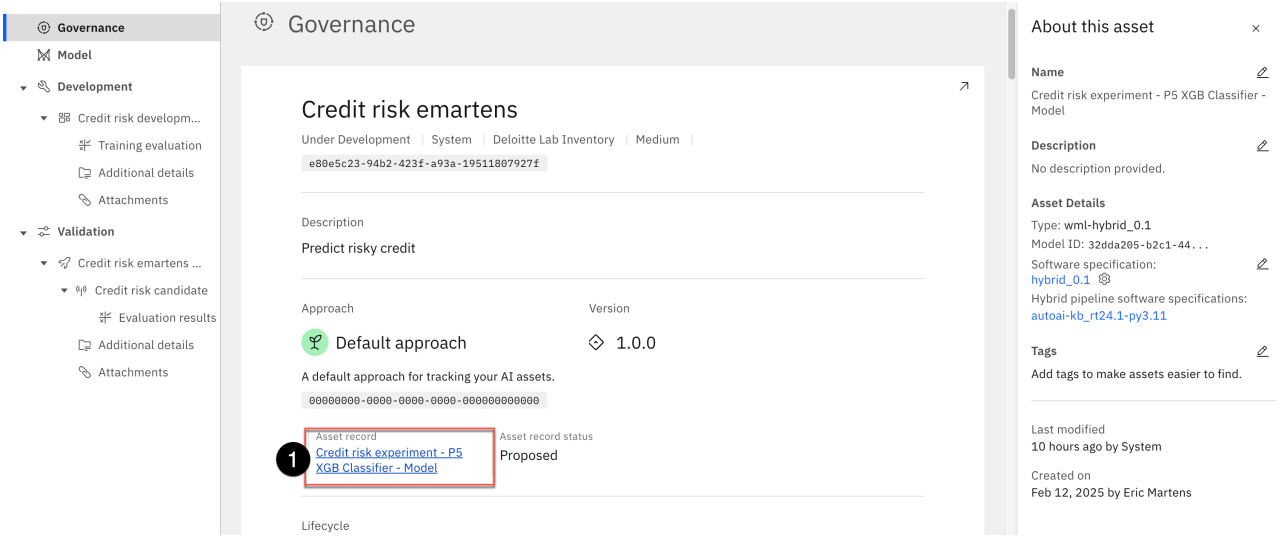
The model you examined is meeting fairness standards, indicating that it is not unfairly biased. However, it is falling short in several quality metrics, indicating that the data scientists and AI engineers likely have more work to do before they can advance the model as a candidate for production deployment.

Dashboards and reporting

In this section, you will see how the watsonx.governance console provides an enterprise-level view of all the use cases and models in development, and see how the metrics generated in the previous section appear in the governance console dashboard. This section is once again performed from the point of view of a risk officer or business stakeholder, as opposed to the data scientists and AI engineers from the previous section.

1. View metrics for the credit risk use case

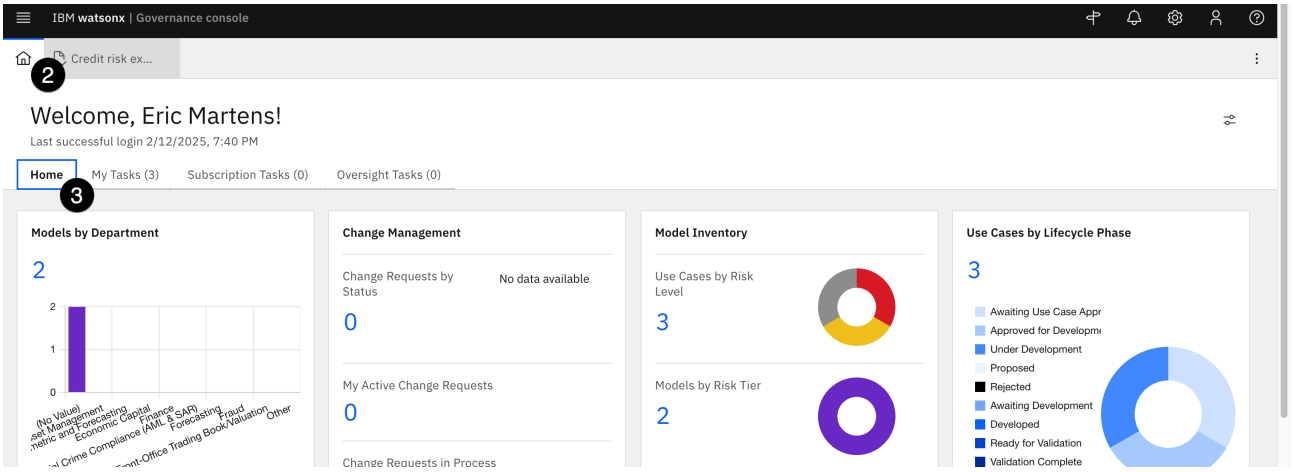
1. Scroll back up to the Governance section of the factsheet, and click on the link beneath Asset record. The governance console opens to the entry for the model.



Note that the Candidate Status of the model is set to Model Candidate, and the Model Status is set to Proposed. These values reflect that the model is in development and has not been approved for deployment to production systems yet.

2. Click on the home icon to return to your home screen.

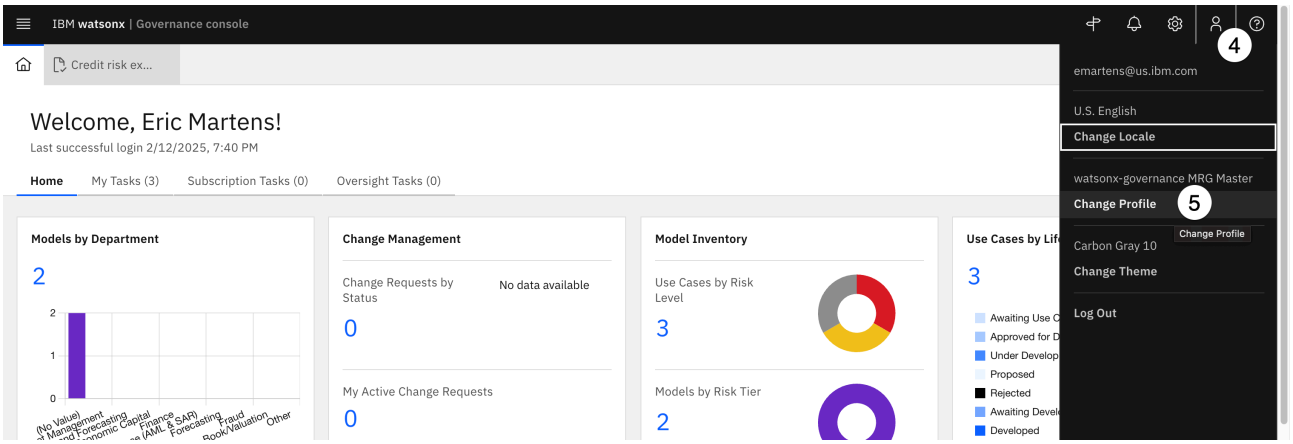
3. Click on the Home tab to view your home dashboard.



The home dashboard contains several different panels showing a breakdown of all the models currently being governed, along with useful links to different regulations and the IBM AI Risk Atlas. This dashboard can be fully configured with different views for different users or profiles. Recall that you set your profile to *watsonx-governance MRG Master* earlier, but that you have access to several other profiles.

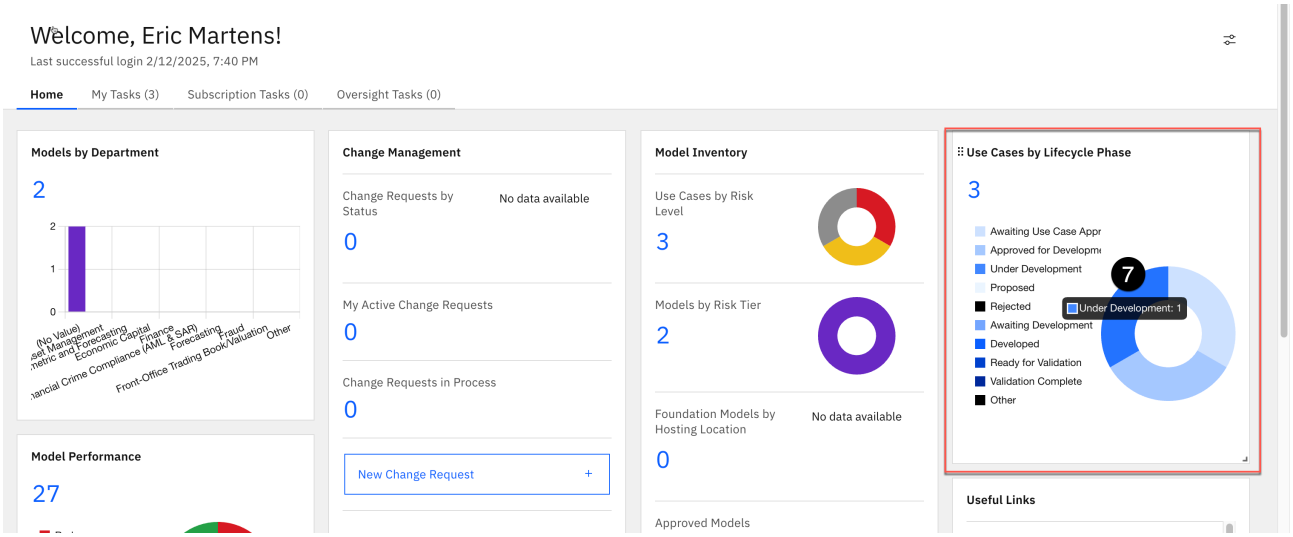
4. Click on the avatar icon in the upper right to open the user menu.

5. Click on the Change profile menu item to open the profile selection dialog.



6. Take a moment to switch back and forth between some of the available profiles, and note how the dashboard changes based on your selected role. Also recall that different roles will see different views of the same object; for example, the *OpenPages Modules Master* will not have access to fill out the mitigation strategies for various risks, as that capability is not part of their profile.

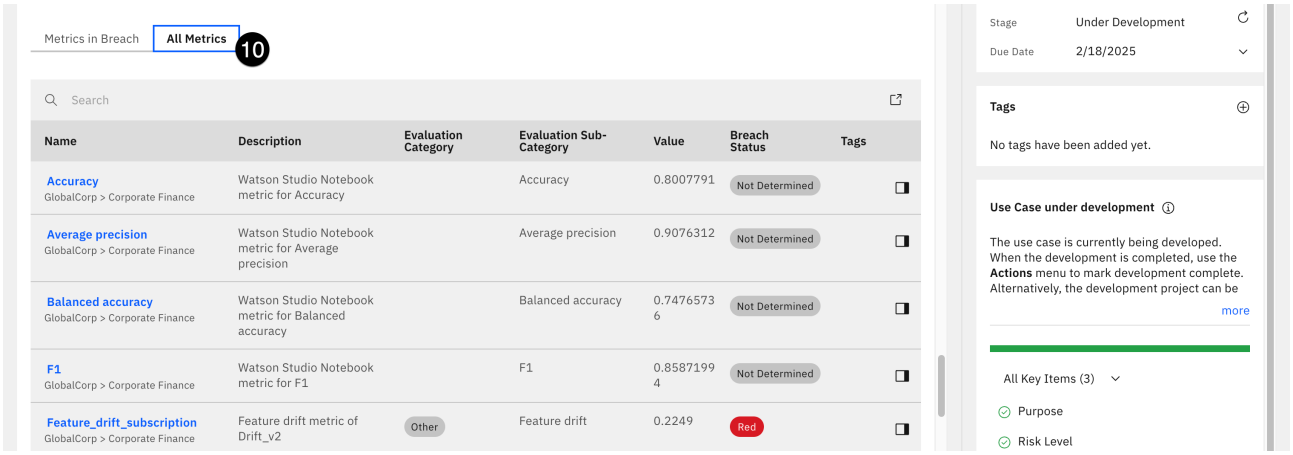
7. When you are finished, return to the *watsonx-governance MRG Master* profile and click on the Under Developement portion of the Use Cases by Lifecycle Phase graph. The Use Cases tab opens, with a filter to show only the use cases that are currently under development.



8. Locate the Credit risk emartens use case from the table and click on it. The use case details screen opens.

9. Scroll down to the Performance Monitoring section. Here, the metrics created by the model evaluation you saw in the previous section are available for risk manager and business stakeholders in a variety of different views. Take a moment to examine the different charts, and note that you can click on many of the indicators for more information on a particular item.

10. Scroll down further to the Metrics in Breach table and click on the All Metrics tab.



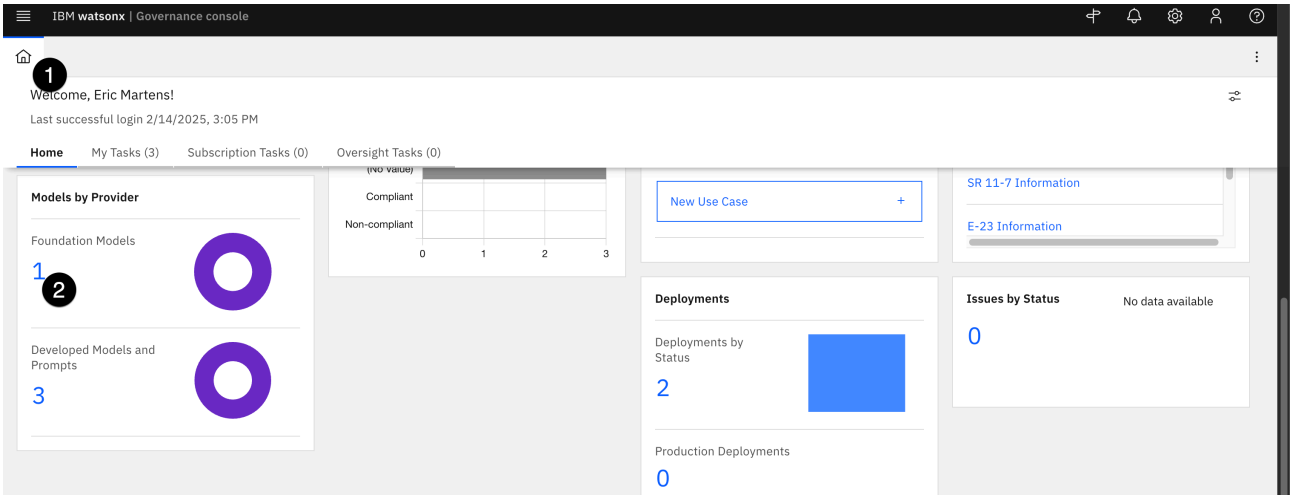
Here, each metric is visible along with its value and breach status (red, yellow, green, or not determined).

The integration between the monitoring service and the governance console allows for model metrics to be calculated and instantly updated and provided to all stakeholders. This can provide dramatic time savings, as it eliminates the need for data scientists to build reports on model performance for stakeholder review. It also eliminates the possibility of human error, and ensures that reviewers have the most up-to-date information at all times.

2. View metrics for generative AI

The watsonx.governance solution offers a comprehensive set of metrics for generative AI as well.

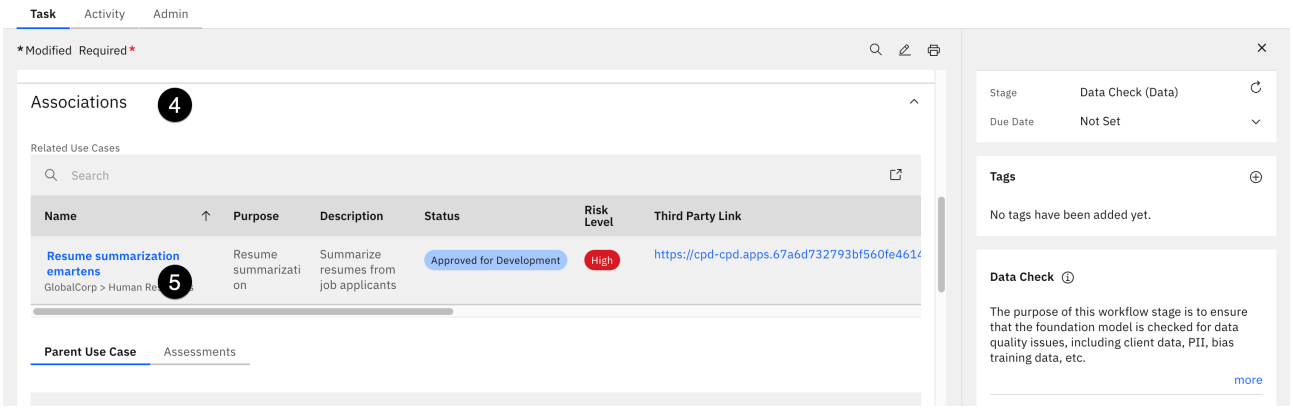
1. Click on the home icon to return to your home tab.
2. Scroll down to the Models by Provider section on the left, and click on the number beneath Foundation Models. The Models tab opens, with a filter set to show only foundation models.



3. The table contains an entry for OpenAI's GPT-3.5-turbo. Click on it. The model details open in a new tab in the governance console.
4. Scroll down to the Associations section, and note that there is an associated use case. This AI use case contains a model that is using the GPT-3.5-turbo large language model via a detached prompt template. Detached prompt templates will be covered in greater detail in the day 2 lab.

The Associates section provides an easy method to determine all the different use cases that are utilizing a particular model, information that would be highly useful for organizations looking to determine the extent of their usage and how any outages, updates, or other issues may impact them.

5. Click on the Resume summarization use case from the Related Use Cases table. The tab for the use case opens.



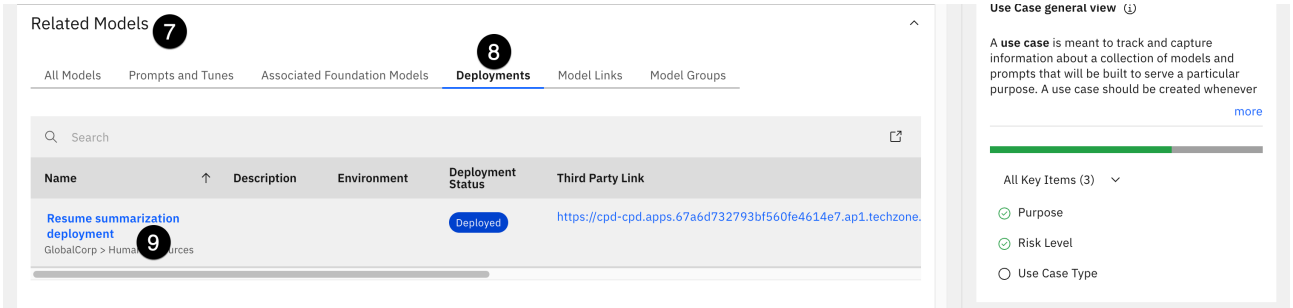
6. Scroll down to the Performance Monitoring section of the use case. As with the previous model, you can click on any of the metrics to get more in-depth information on the score and the status. The Metrics in Breach table also provides a view of all metrics that fell below the acceptable thresholds.

The use case view shows a summary of all models associated with a particular use case, but you can also get more information on a particular deployment.

7. Scroll down further to the Related Models section of the use case. In the All Models tab of the table, note that there are entries for both the prompt and the source large language model.

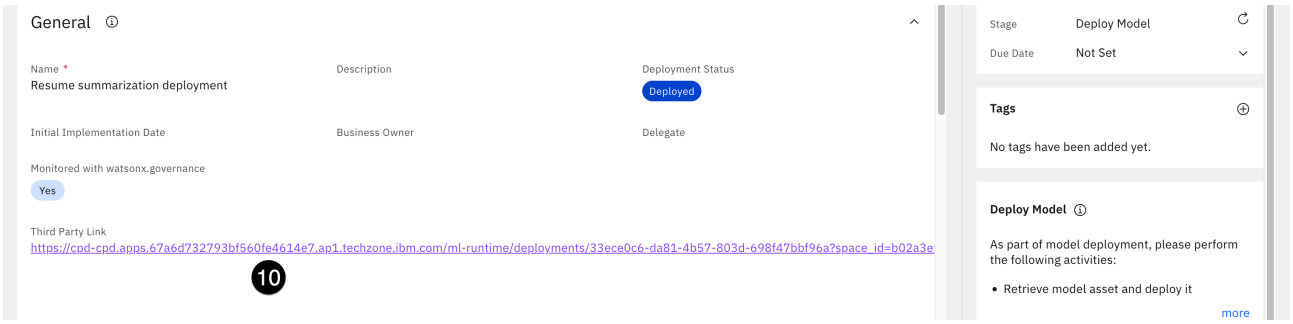
8. Click on the Deployments tab of the table to get a listing of all deployed models associated with the use case.

9. Click on the Resume summarization deployment entry in the table. A new tab for the deployment opens in the governance console.



The entry for the deployment contains metrics from the most recent evaluations, links back to the parent use case, and other metadata.

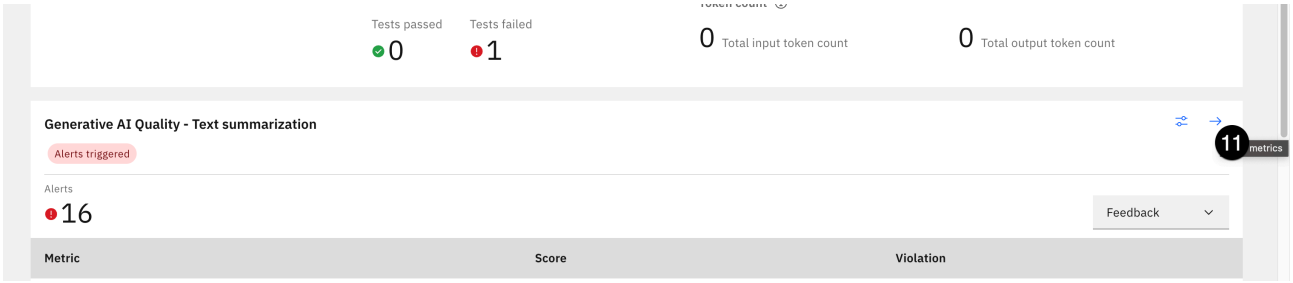
10. In the General section of the page, click on the Third Party Link. A new browser tab opens to the model's factsheet in the watsonx interface.



Recall that factsheets metrics and metadata for the model, and are automatically synchronized with the monitoring service and the governance console. The current view is designed for data scientists and AI

engineers, as opposed to the governance console, which is targeted more towards business users and risk managers.

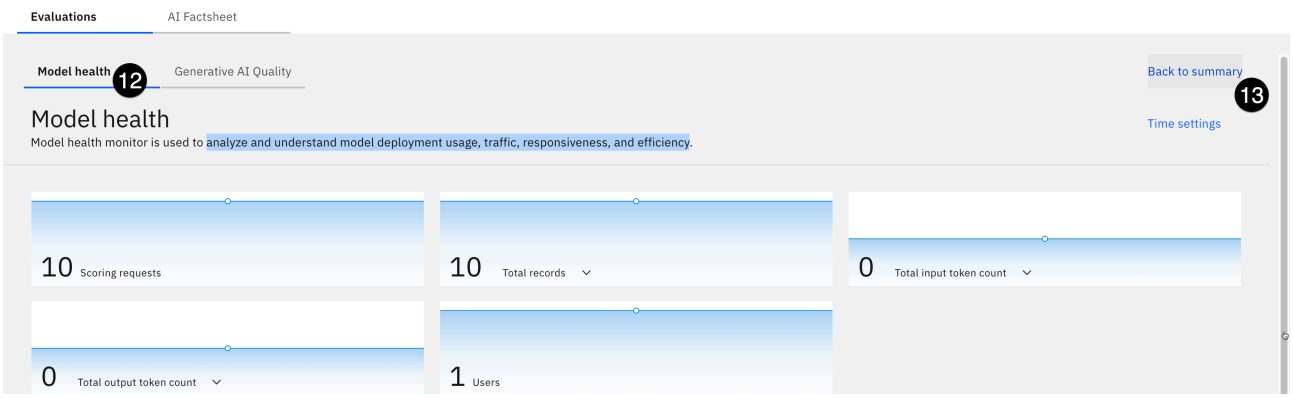
11. In the Generative AI Quality section, click on the arrow icon for a better view of the available metrics.



12. Take a moment to explore the different metrics for quality, content analysis, HAP, and more by clicking on the different sections to expand them. When you are finished, scroll back to the top of the screen and click on the Model health tab.

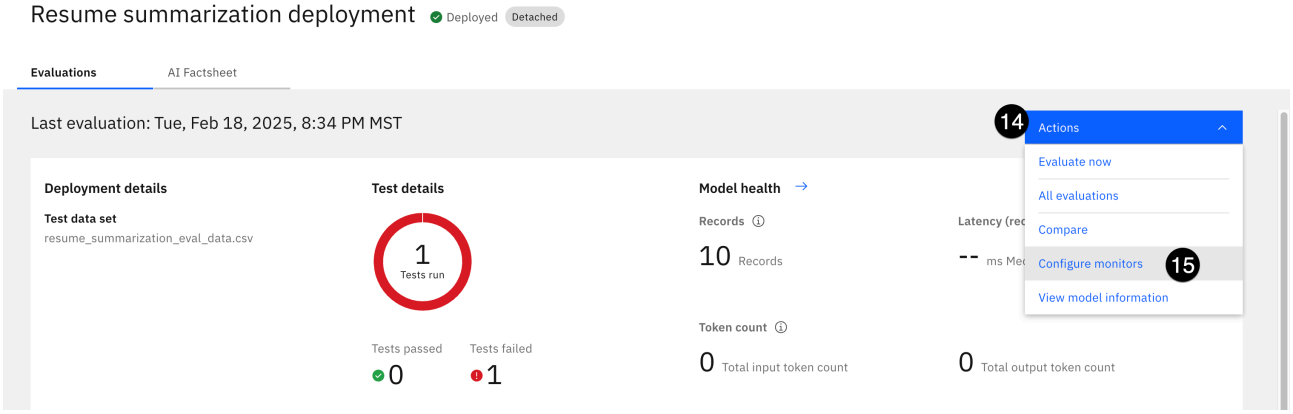
The model health metrics provide information on model deployment usage, traffic, responsiveness, and efficiency.

13. When you a ready, click the Back to summary link to return to the previous tab.

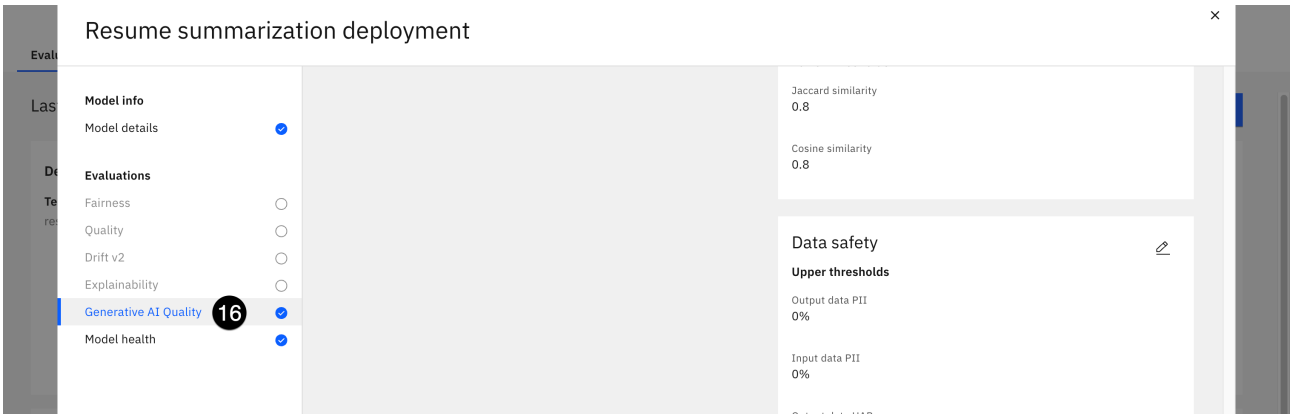


14. Click on the Actions button to open the Actions menu.

15. Note the different actions available, including running evaluations, comparing two models, and seeing a full evaluation history. Click on Configure monitors.



16. Click on the Generative AI Quality item from the menu on the left.



Take a moment to examine the tiles on the right, which include the different metrics categories available and show the minimum thresholds for each metric. Administrators with proper authority can use this screen to change the thresholds based on legal or industry requirements, which will then affect whether the metrics show on the factsheet and in the governance console as in breech.

Note that any changes you make here will affect all other lab users, so please do not save any changes to the metrics.

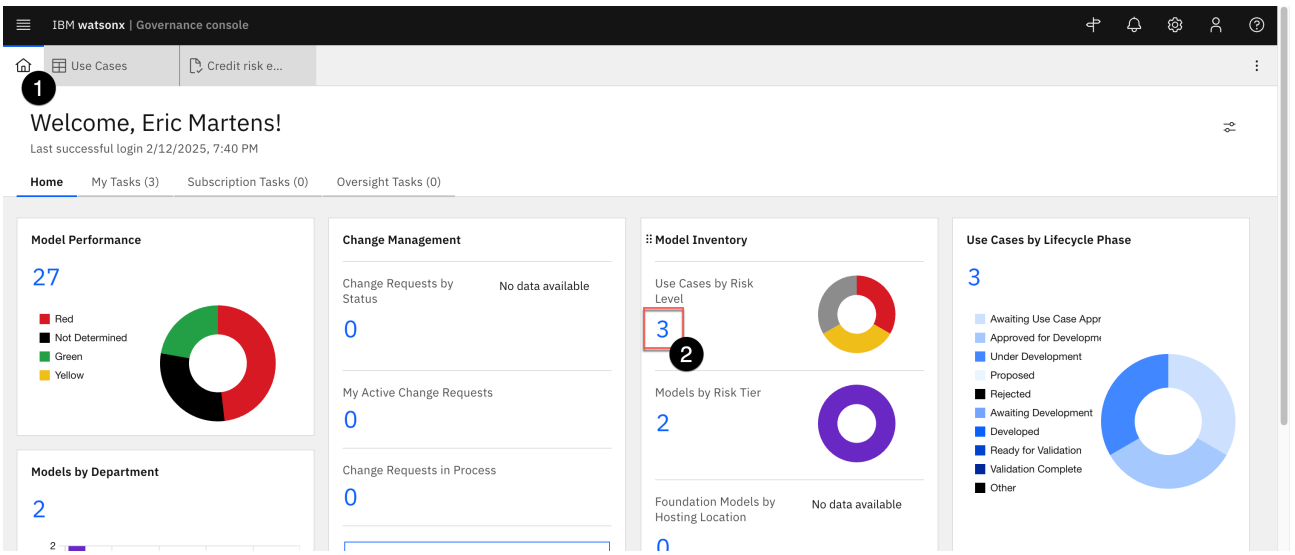
17. When you are finished, close the current browser tab and return to the tab with the governance console.

3. View other use cases

At this point in the lab, take a moment to review some of the use cases created by your colleagues, and the various risks that they have identified.

1. Click on the home icon to return to your home screen.

2. Locate the Model Inventory tile, and click on the number to the left of the Use Cases by Risk Level graph.



The use cases that all of your colleagues have built as they have gone through the lab will be visible, along with their associated risk levels.

3. Click on some of the use cases your colleagues have created, and explore the different risks that were identified. If you wish you can even click on the risk identification questionnaire and the applicability assessment for the use case to see the answers they provided.

Conclusion

In this lab, you got experience with watsonx.governance from the perspective of daily users -- risk managers, business stakeholders, data scientists, and AI engineers. You saw how to identify a use case in which an organization can use AI to solve a business problem. You learned how that request can progress through a defined workflow, using questionnaires to identify potential risks and compliance issues.

Next, you explored how watsonx.governance fits into the model development process, capturing model facts and metadata in a central location. You saw some of the different metrics available in watsonx.governance for predictive models, and how they can be evaluated against customizable thresholds to ensure models meet regulatory and industry standards.

Finally, you saw how those metrics are automatically updated in the governance console, providing up-to-date information for risk managers and other stakeholders.