

## Lab - AI GOVERNANCE

### 1.1 Lab overview

AI governance is the process of defining policies and establishing accountability to guide the creation and deployment of AI systems in an organization. Capturing and managing metadata on AI models as part of AI governance processes provides transparency into how AI systems are constructed and deployed, a key requirement for most regulatory concerns.

This lab demonstrates how IBM's Cloud Pak for Data applies the methodology of AI governance to enable organizations to trust AI-powered outcomes at every step of the AI lifecycle. You will apply bias, risk, and drift measures to ensure transparency and explainability of results from an AI model in production. The following Cloud Pak for Data toolkits will be demonstrated: AutoAI, Jupyter notebooks, Factsheets, OpenScale and Watson Trust.

### 1.2 Personas represented in this lab

Persona (Role)	Capabilities
 Administrator	<p>Administrators set up and maintain the CPD environment itself.</p> <p>Note: while some of the Admin work can be done in the CPD web client, most of the Admin work on the cluster would be done in OpenShift which is outside the scope of this workshop.</p> <p><i>The exercises in this first lab represent some typical CPD Administrator activities.</i></p>

Persona (Role)	Capabilities
 Data Scientist	Data Scientists bring expertise in statistics and the process of building ML/AI models to make predictions and answer key business questions.

Persona (Role)	Capabilities
 Business Analyst	Business Analysts deliver value by taking data, using it to answer questions, and communicating the results to help make better business decisions.

1.3

## 1.3 Return Home

1. Make sure you are logged in as [admin](#), then select the [IBM Cloud Pak for Data](#) link at the top



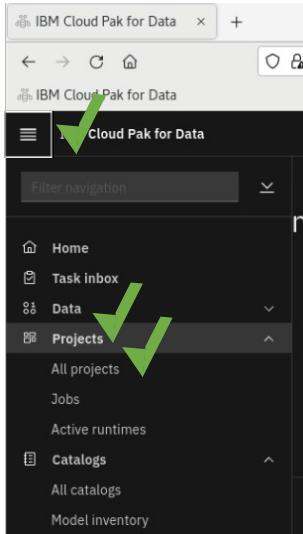
This will place you in the home screen for Cloud Pak for Data. This screen is completely customizable, allowing you to brand according to your organization, add and delete any of the tiles, etc. In addition, this screens' content will change based on the role of the user logging in.

A screenshot of the IBM Cloud Pak for Data home screen. At the top, it says "Welcome, admin!". Below this, there are several tiles: "Discover services" (Extend the functionality of the platform by installing services from the catalog), "Manage users" (Connect to your identity provider and specify who can access the platform), and "Stay informed" (Monitor the services that are running and understand how you are using resources). To the right is a decorative graphic of a 3D cube made of smaller cubes with a magnifying glass icon. Below these tiles is an "Overview" section with a "Recent projects" card showing "IA Project - Watson Query, WKC, DataStage Assets" from "Sep 13, 2022 01:53 PM". There are also cards for "Requests" (Data requests: 0) and "Notifications" (two entries about publishing metadata enrichment results). On the left, there's a "Quick navigation" sidebar with links like "OpenPages openpagesws", "All projects", "Instances", "Databases", "Data visualization", and "Catalogs".

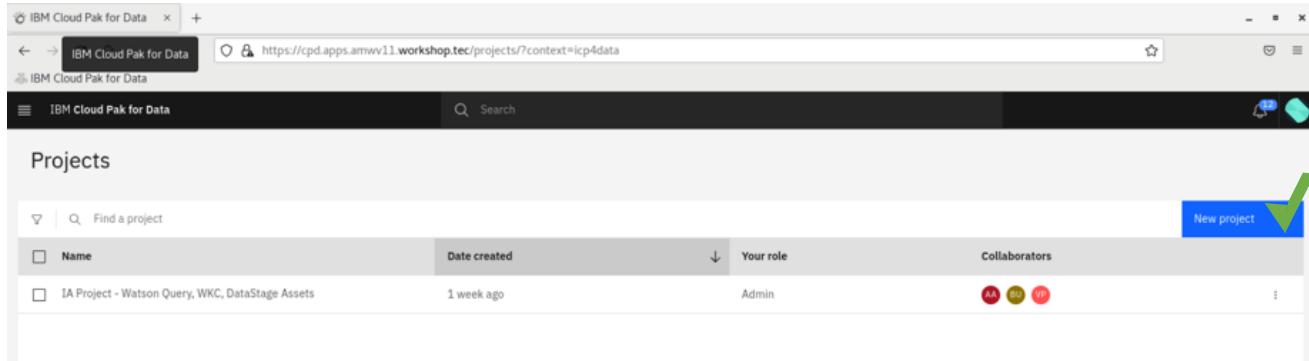
Note the 'Recent Projects' section on the home screen. Projects are where the user develops assets – access Operational assets, Configuration assets, Environments, Jobs, Asset storage, Integrations and on and on are all housed within a project during development. Follow the lab steps below to create the AI Governance Project.

## 1.4 Create the AI Governance Project

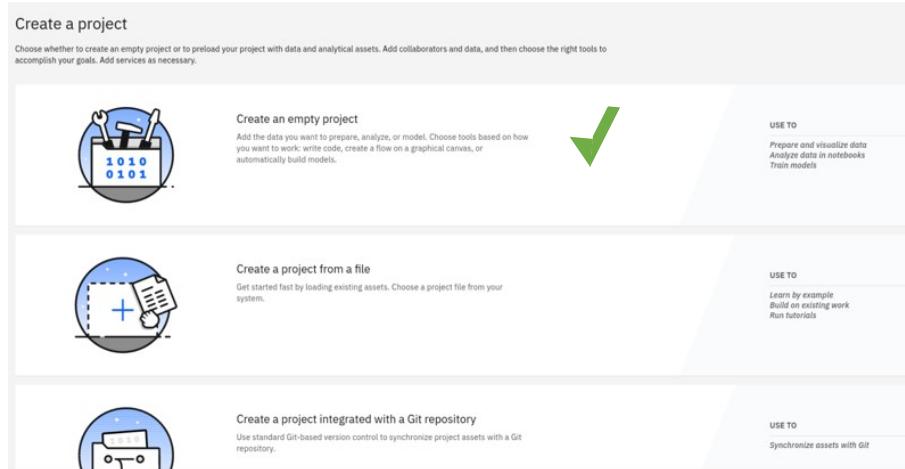
1. Select the **Hamburger menu** (top left), then select “**Projects**”, and then “**All Projects**”.



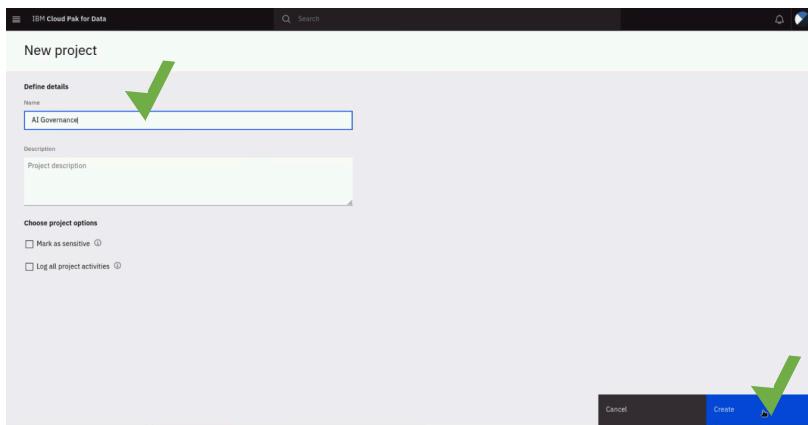
2. In the Projects window, select the “**New Project**” Button



3. Select “**Create an empty project**”.

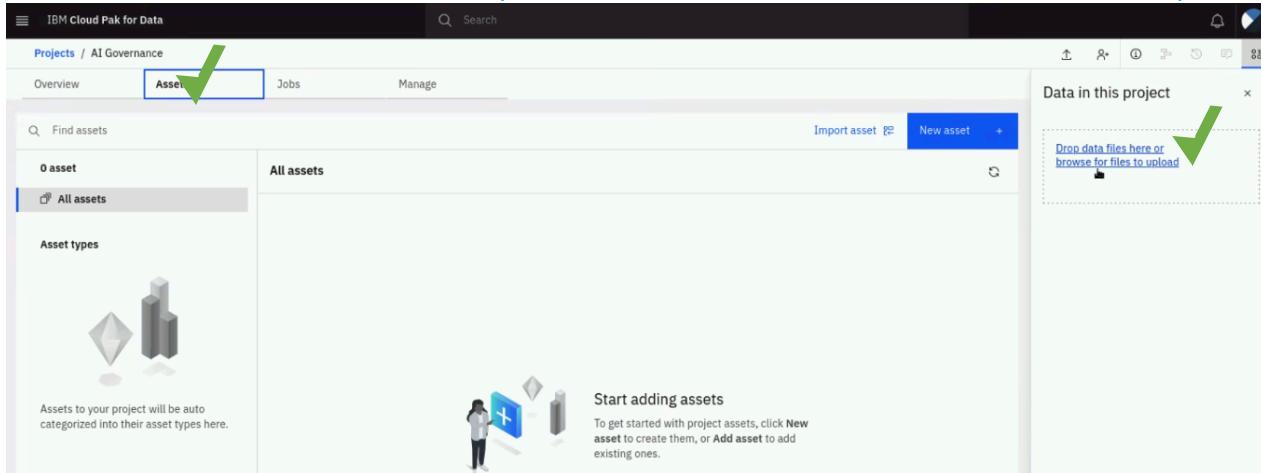


4. Select the Name box and type “AI Governance”, then select the “Create” button (lower right).

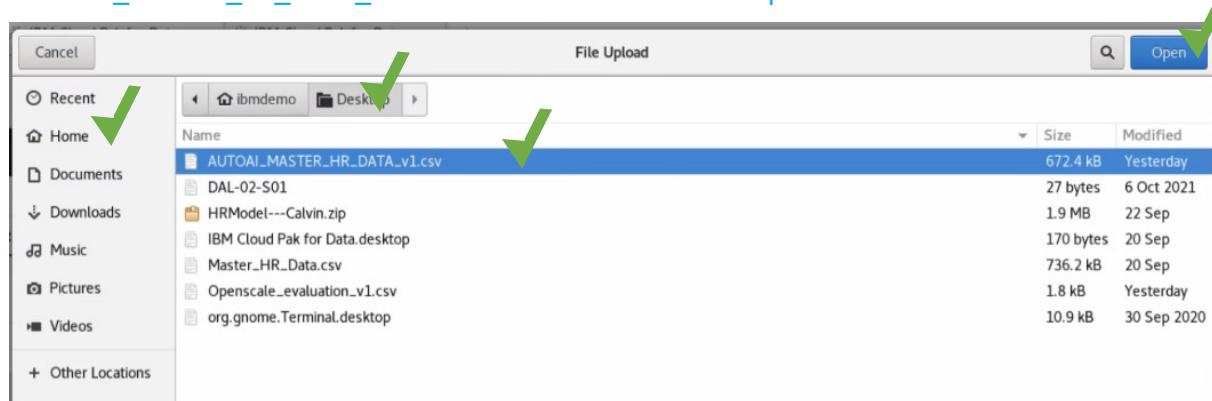


Now that the project has been created, we will add a dataset to the AI Governance project for an AutoAI process.

5. Select the “Assets” tab, then the “Drop data files here or browse for files to upload” link.



6. In the navigation window select “Home”, then select “Desktop”, then select “AUTOAI\_Master\_HR\_Data\_v1.csv” and then select the “Open” button



This screen will appear showing the new data asset within the Assets tab.

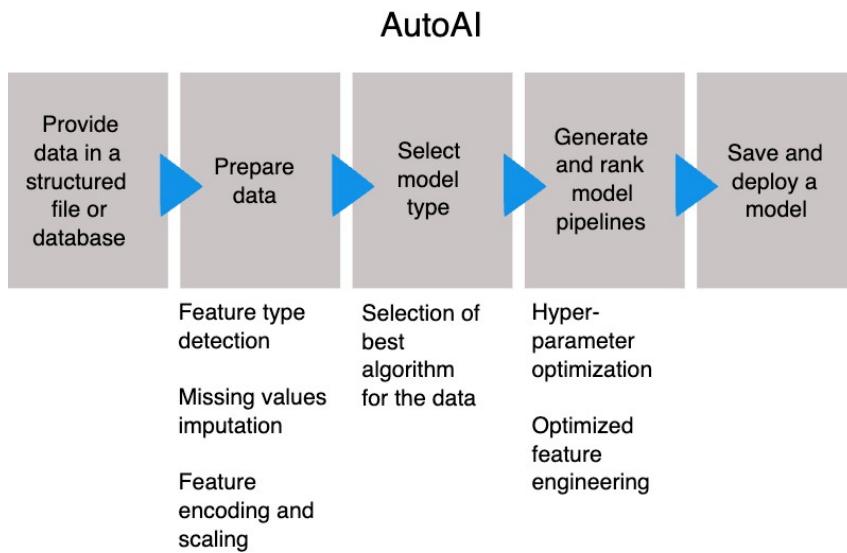
You have successfully created a project and added a dataset to begin your attrition analysis. A project is a workspace where you can collaborate with others to create a data science project. From a project, you can add assets, tools and define a workspace to derive value through data science. We will now use AutoAI to create a Machine Learning Model within our project.

## 1.5 Developing AI Models in Cloud Pak for Data

The AutoAI graphical tool in Watson Studio analyzes your data and discovers data transformations, algorithms, and parameter settings that work best for your predictive modeling problem. AutoAI displays the results as model candidate pipelines ranked on a leaderboard for you to choose from.

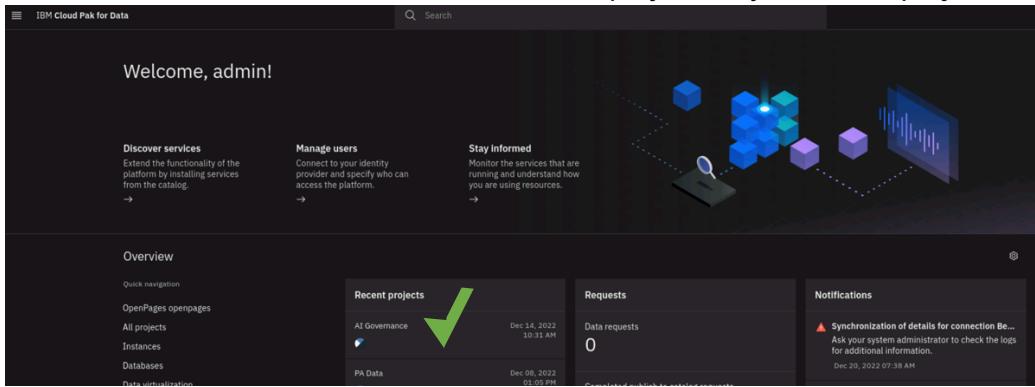
Using AutoAI, you can build and deploy a machine learning model with sophisticated training features with zero code through a graphical interface.

AutoAI automatically runs the following tasks to build and evaluate candidate model pipelines

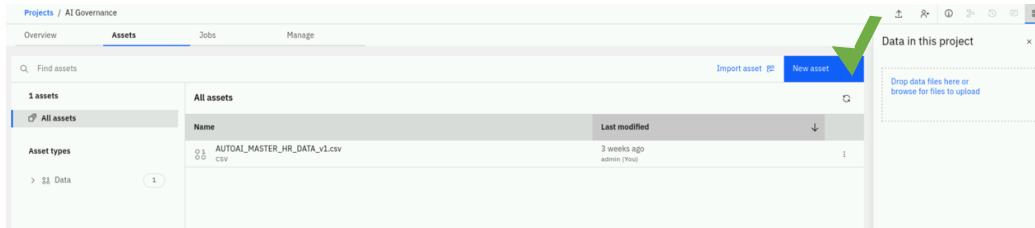


This lab will showcase the AutoAI functionality in Cloud Pak for Data using the assets we created in the AI Governance Project to employee attrition for the Human Resource department.

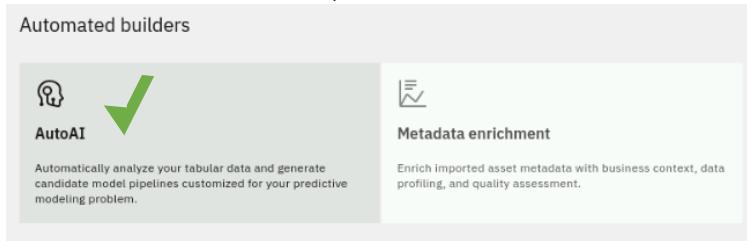
- Select Home then Select the “AI Governance” project \*\*if you left the project folder that you just created\*\*



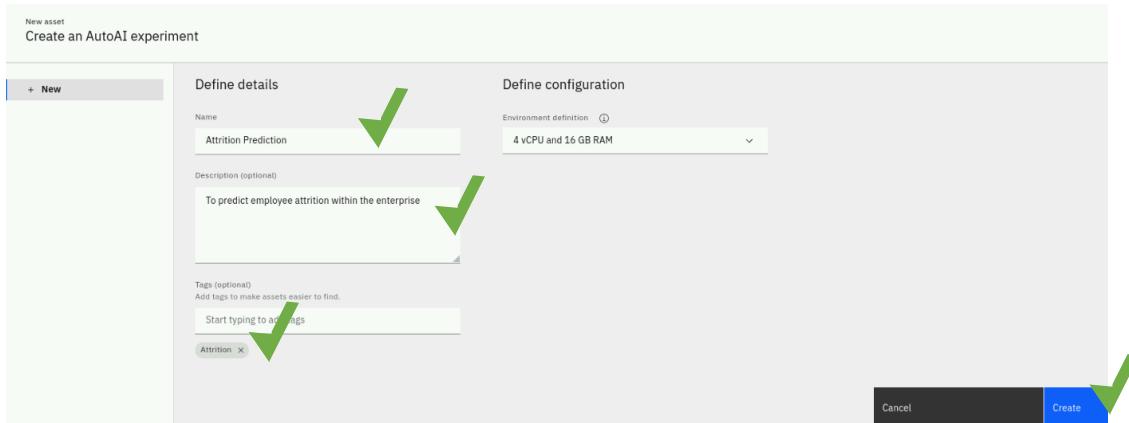
- Select “New asset”



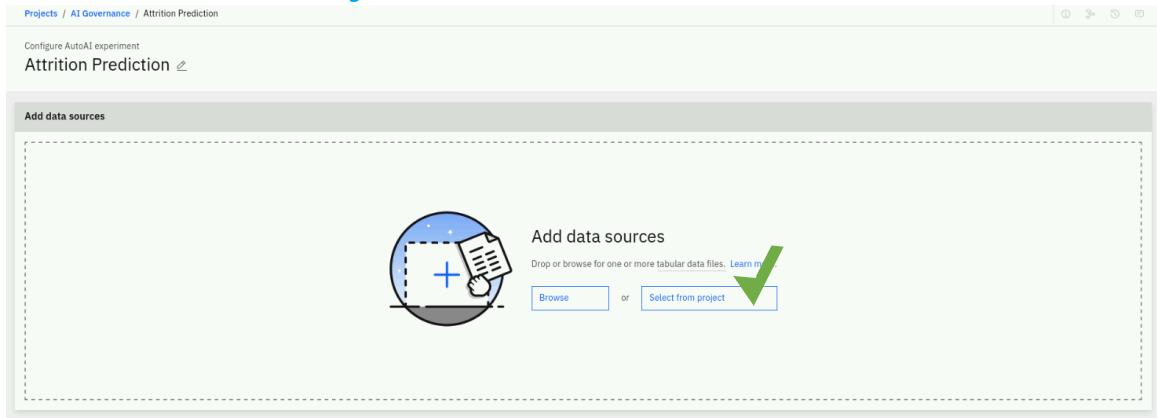
- In the New asset window, Select the “AutoAI” tile



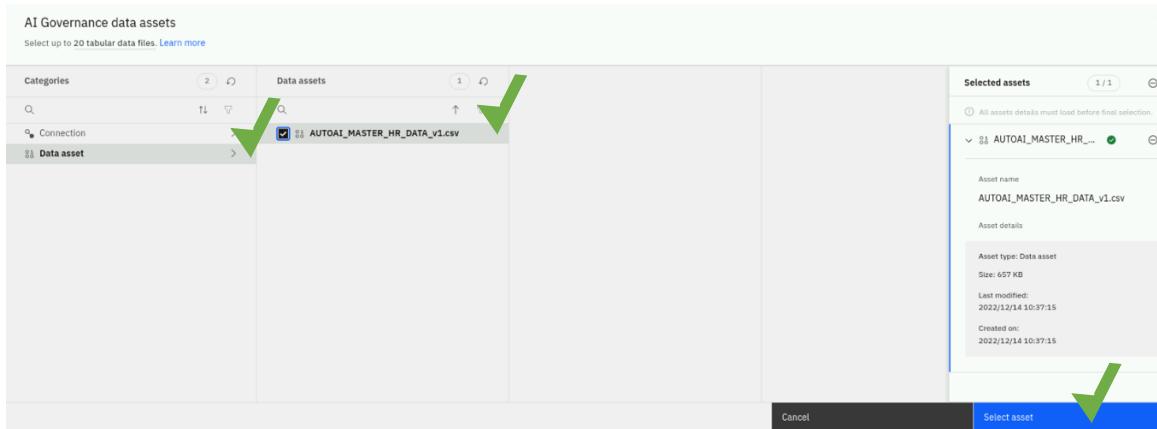
- Select each field in the Define details pane and enter the information as shown in the diagram below. Name = “Attrition Prediction”, Description = “To predict employee attrition within the enterprise”, Tags = “Attrition”. Select the “+” sign after typing in “Attrition” to assign the tag. Then Select “Create”.



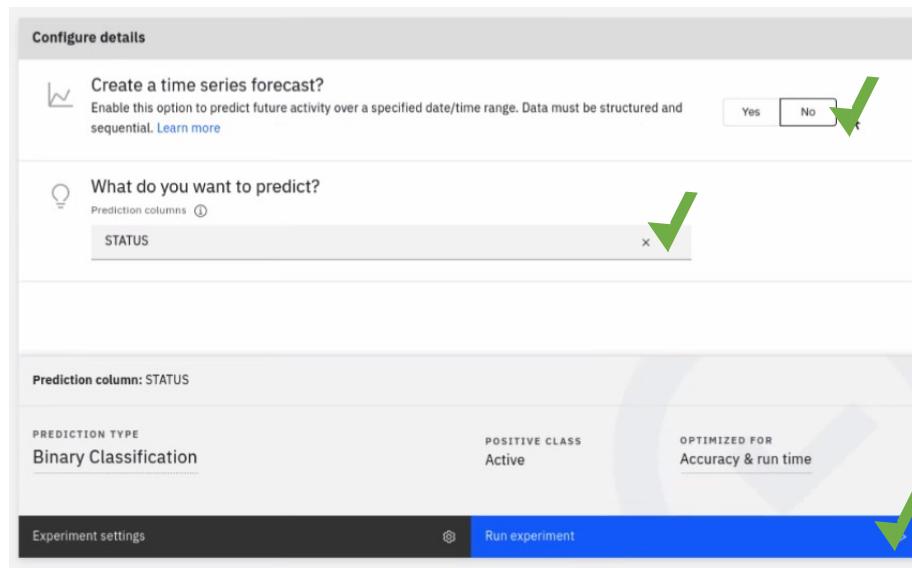
5. Select “[Select from Project](#)” button to add another data source to connect to.



6. Select the right of [Data asset](#) to open the path to the AUTOAI\_MASTER\_HR\_Data\_v1.csv dataset. Select the [radio button](#) then select “[Select asset](#)”.



7. Select “[No](#)” in the “Create a time series forecast?” area. Then, select the drop-down [arrow](#) in the “What do you want to predict” section and Select “[Status](#)”, and then Select the “[Run experiment](#)” button



While running the experiment, the Watson Studio AutoAI tool is analyzing the data and discovering data transformations, algorithms, and parameter settings best suited for the specific predictive modeling experiment. This process could take 2-3 minutes.

You will see this display while it is executing



When the experiment completes, AutoAI displays the results as model candidate pipelines ranked on a leaderboard for you to choose from. Note that AutoAI has found multiple algorithms which we can use for our attrition prediction. We will focus on the top 2.

8. Hover over the **first model** in the Pipeline leaderboard list and Select “Save as”.

The screenshot shows the 'Pipeline leaderboard' section. Pipeline 2 is highlighted as the 'Champion Model for attrition prediction'. The pipeline details include an XGB Classifier algorithm with an accuracy of 0.897. A large green checkmark is placed over the 'Save as' button.

Rank	Name	Algorithm	Accuracy (Optimized)	Enhancements	Build time
1	Pipeline 2	XGB Classifier	0.897	HPO-1	00:00:09

*NOTE: Your Pipeline champion may differ than above image.*

9. Select the “Name” field and **type “(Champion)”** in front of the prepopulated text “Attrition Prediction – P3 Random Forest Classifier”. Then Select the “Description” field and **type “Champion Model for attrition prediction”**. Then Select the “Tags” field, **Select “Add new tag”** pop-up button, and **type “Champion”** in the “Tags” field. Finally, Select the “Create” button.

The 'Save as' dialog box is shown. It has two tabs: 'Model' and 'Notebook'. The 'Model' tab is selected. The 'Define details' section contains fields for 'Name' (set to '(Champion) Attrition Prediction - P2 Snap Random Forest Classifier'), 'Description (optional)' (set to 'Champion Model for attrition prediction'), and 'Tags' (set to 'Champion'). A green checkmark is placed over the 'Name' field. Another green checkmark is placed over the 'Description' field. A third green checkmark is placed over the 'Tags' field. A blue arrow points to the 'Add new tag' button. A fourth green checkmark is placed over the 'Create' button at the bottom right.

Note: Select the “X” in the upper right corner of the “Saved model successfully” pop-up window



10. Select the second model in the “Pipeline leaderboard” list (Pipeline 3 (your Pipeline may vary)) and Select the “Save as” button

Rank	Name	Algorithm	Accuracy (Optimized) Cross Validation	Enhancements	Build time
1	Pipeline 2	Snap Random Forest Classifier	0.981	HPO-1	00:00:08
2	Pipeline_3	Snap Random Forest Classifier	0.981	HPO-1 FE	00:00:44

11. Select the Name field and type “(Challenger)” in front of the prepopulated text “Attrition Prediction – P3 Random Forest Classifier” (*Your text may vary depending on pipeline*). Then Select the Description field and type “Challenger Model for attrition prediction”. Then Select the Tags field and type “Attrition” finally, Select the

“Create” button.

Note: Select the “X” in the upper right corner of the “Saved model successfully” pop-up window.



This lab used CPD’s AutoAI tool to simplify the creation of AI models. AutoAI automates various tasks to ease the workflow for data scientists creating machine learning models. It automates steps such as preparing data for modeling with automated feature engineering, provides choices for the best algorithm/estimator for the problem, experiments with pipelines and hyperparameter optimization for the trained models. Note that all processing steps are documented as metadata and consumed by Factsheets.

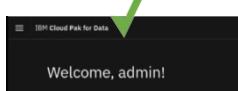
Cloud Pak for Data provides other options to create AI models through other tools such as SPSS Modeler and Jupyter notebooks. These products are packaged within CPD and can be accessed through the Asset button. As part of IBM’s Trustworthy track, note that CPD enables you to house your enterprise AI utilization in a single platform to ensure trust is exhibited across all model development phases.

## 1.6 FactSheets

Proposals for higher quality and more consistent AI documentation have emerged to address ethical and legal concerns and general social impacts of such systems. However, little is known about the needs of those who would produce or consume these new forms of documentation, as well as how to create this documentation. This is where IBM's Factsheet addresses gaps in current model development processes, and its purpose is to:

- Define the scope for policy creation which includes what information is collected on models, who can use the model and for what purpose, and the way it should operate
- Automatically capture the model facts as detailed in the FactSheet template throughout the AI lifecycle
- Offer extended knowledge on unapparent AI model development metrics in multiple formats depending on the preferences of the user and external audience

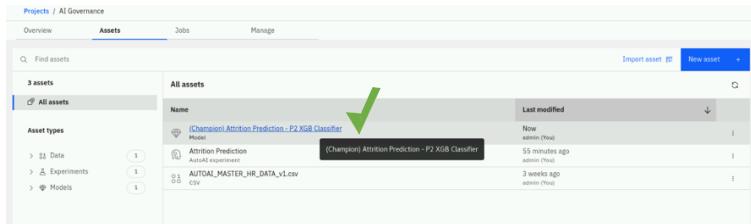
1. Return to the “IBM Cloud Pak for Data” home screen *\*\*if you are still within the model, go to step 3\*\**



2. Select the “AI Governance” project folder to review our saved models.



3. Select the “Assets” tab and then Select the “(Champion) Attrition Prediction – xxx” asset



This Metadata screen will appear for your review

4. Review the AI Factsheet for your model. AI Factsheets capture model metadata across the model development lifecycle, facilitating subsequent enterprise validation or external regulation. AI Factsheets enables model validators and approvers to get an accurate, always up-to-date view of the model lifecycle details. In this example, we have retrieved the training scores of our model.

(Champion) Attrition Prediction - P2 XGB Classifier		
Promote to deployment space		
Training metrics		
Metric	Training data	Heldout data
Accuracy	0.8961906	0.8810127
Average precision	0.9611343	0.8037983
Balanced accuracy	0.555334	0.5351476
F1	0.9447205	0.9360544
Log loss	-0.28834936	-0.29009596
Precision	0.90116274	0.8991723
Recall	0.99271923	0.97727275
Rec.auc	0.78383374	0.7994186
Input schema		
Feature	Data type	Description

Note: This integration with Watson Machine Learning and Watson OpenScale also results in the capture of deployment metadata and introduces critical monitors for bias detection and quality in the subsequent steps of IBM's AI Governance capabilities.

## 1.7 Deployments

IBM Cloud Paks enable the deployment of models, scripts, functions, manage your deployments, and prepare your assets for model production. Watson Machine is used to manage deployment spaces so that you can put models into production, then monitor these models for fairness and explainability.

Deployment spaces contain deployable assets such as deployments, deployment jobs, associated input and output data and the associated environments. You can use this space to deploy models and manage your deployments. The deployments dashboard is an aggregate view of deployment activity available to you across spaces.

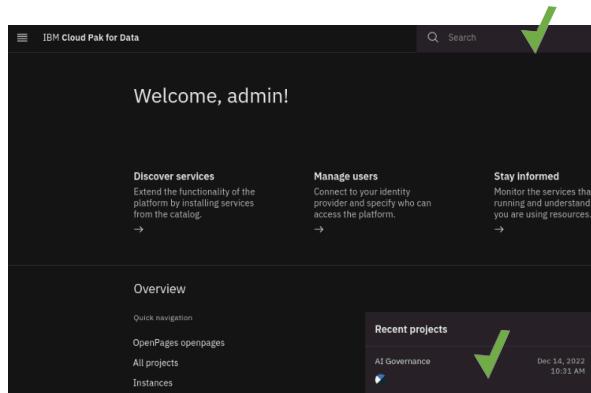
A deployment space is not associated with a project. You can deploy assets from multiple projects to a space, and you can deploy assets to more than one space. For example, you might have a test space for evaluating deployments, and a production space for deployments that you want to deploy in business applications.

**Deploy**

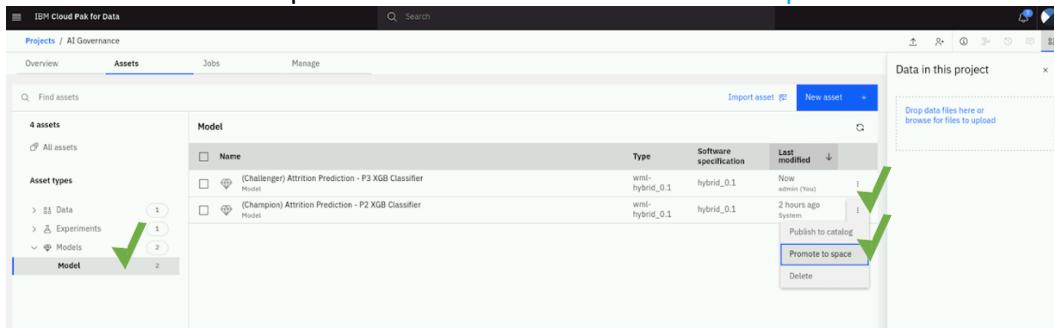
- Organize your assets in a deployment space
- Deploy and score models and functions
- Monitor deployments in a dashboard

In this portion of the lab, we will add the models we created into a Deployment space called, “AI Governance Deployment”. We will then be able to manage these deployed M/L models via Cloud Pak.

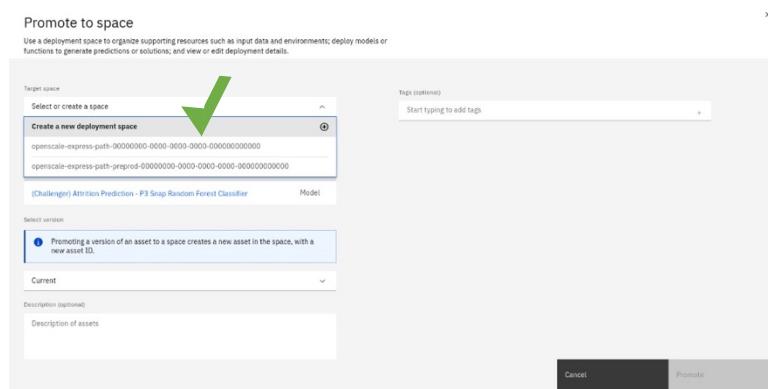
1. Begin at the Home Screen by Selecting “[IBM Cloud Pak for Data](#)” in the upper left of the window. Select the “[AI Governance](#)” Project by selecting it in the Recent projects area



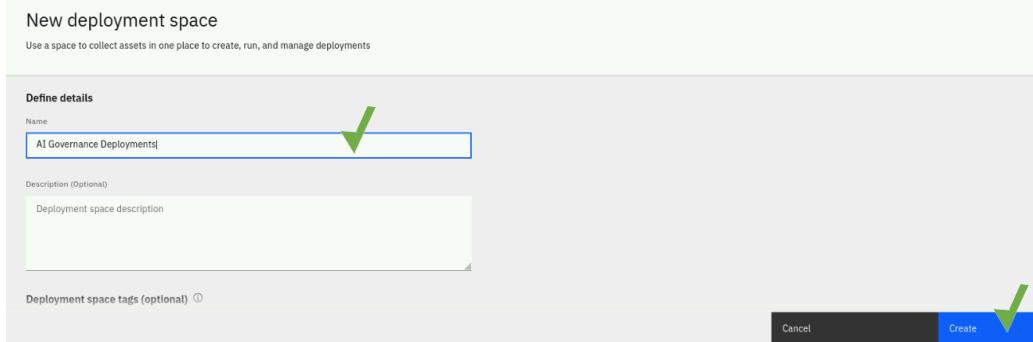
2. From the left pane of the project's Assets tab, select “[Models](#)”, then click the vertical ellipsis icon beside the Champion model and select “[Promote to space](#)”.



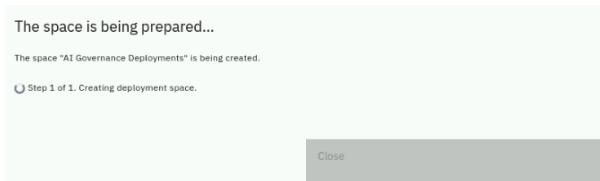
3. Create a new deployment space by selecting “[Create a new deployment space](#)” from the drop- down menu within the Target Space area.



4. Name the space “[AI Governance Deployments](#)” and select the “[Create](#)” button



This notification window will appear

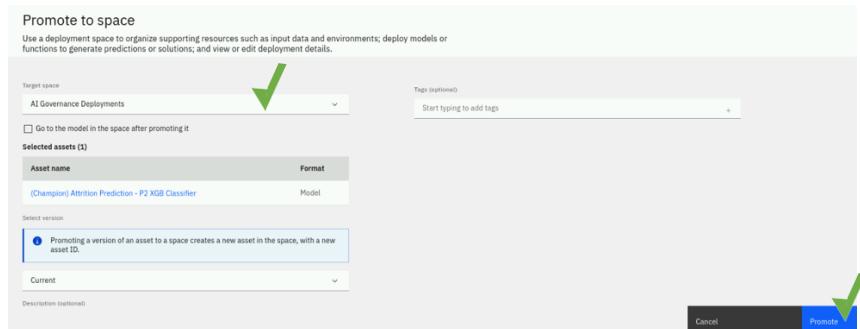


5. Close the “This space is ready” notification window. Select “Close”

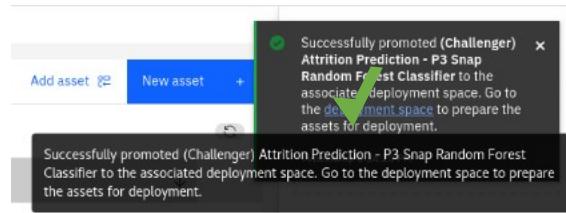
The space is ready  
Close this notification to resume your work. Click **Deployments** in the navigation pane to view and access the new space.  
Step 1 of 1. Creating deployment space.



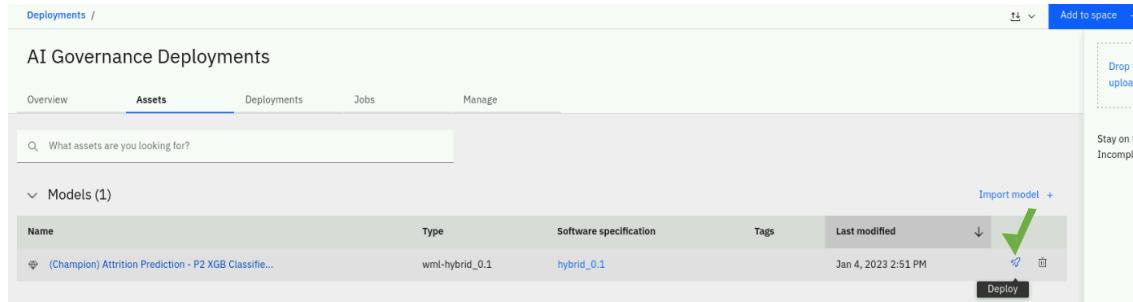
6. Select the “Promote” button



7. Upon completion – select the “Deployment space” link from the notification window.



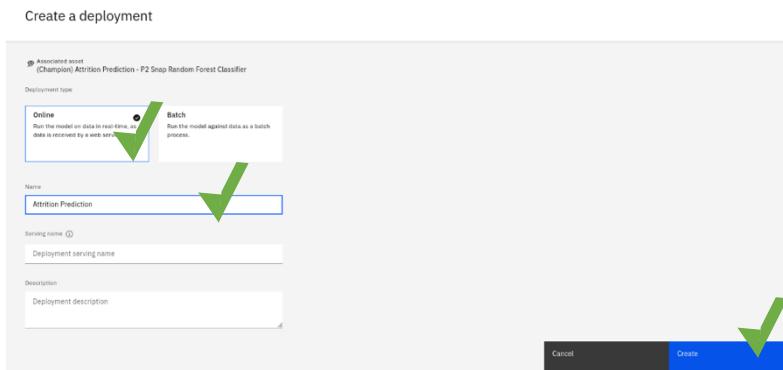
8. Returning to the “AI Governance” deployment space, select the **Asset** tab. To deploy your model, hover your mouse over the model and select the “Rocket” icon.



Deployment spaces are divided into two categories, online deployments, and batch deployments. For this activity, let's focus on online deployments and the capabilities that are contained within an online deployment. When an online deployment is created (also called Web service), the deployment is used to load a model or Python code and generate predictions online, in real time.

*Note: If a ‘Welcome to your deployment space’ box pops up, select ‘Maybe Later’.*

9. Select “[Online](#)” in the “Create a deployment” window, then, select the Name field and Name it “[Attrition Prediction](#)” and then select the “[Create](#)” button



10. While it is being deployed, you will be directed back to your AI Governance Deployments. select the “[Deployments](#)” tab to see the status. This will take 2-4 minutes to complete and the status to update.

Name	Type	Status	Asset	Tags	Last modified
Attrition Prediction	Online	In progress	(Champion) Attrition Prediction - P2 XGB Classifier		Jan 4, 2023 2:56 PM

11. The deployment space has been successfully created. Select the “[Attrition Prediction](#)” Name

Name	Type	Status	Asset
Attrition Prediction	Online	Deployed	(Champion) Attrition Prediction - P2 XGB Classifier

12. Select the “[Test](#)” tab

```
# TODO: manually define and pass values to be scored below
curl -X POST --header 'Content-Type: application/json' --header 'Accept: application/json' --header 'Authorization: Bearer $IAM_AUTH_TOKEN' -d '{"input": [{"field": "$ARRAY_OF_INPUT_FIELDS"}, "values": ["$ARRAY_OF_VALUES_TO_BE_SCORED"]]}' https://cpd-cpd-instance.apps.amev11.workshop.tec/m1/v4/deployments/7d580dd3-cd41-4c89-8881-3a2deaf4a0/predictions?version=2023-01-04
```

Note: Test provides a place where you can enter data and get a prediction back from the deployed model. If your model has a defined schema, a form shows on screen. In the form, you can enter data in one of these ways:

- 1) You could enter data directly in the form – OR...

The screenshot shows the 'Attrition Prediction' API test interface. At the top, there are tabs for 'Deployments', 'API reference', 'Test' (which is selected), and 'Deployment details'. Below the tabs is a section titled 'Enter input data' with a sub-section 'Input'. It includes a 'Paste ZOON' button, a note about CSV file size (50 MB), and a 'Download CSV template' link. A green arrow points to the 'Title' field in a table header. Another green arrow points to the 'Division' field in the same table header. The table has columns for 'EMPID (double)', 'TITLE (other)', 'DEPARTMENT (other)', 'FUNCTION (other)', 'DIVISION (other)', 'UNION\_STATUS (other)', 'EMPLOYMENT\_CATEGORY (other)', 'AGE (double)', 'GENERATION (other)', 'PAY\_SCALE\_GROUP (other)', and 'GENDER'. There are 6 rows of data in the table.

- 2) Select the **JSON** tab and enter your input data as JSON code. Regardless of method, the input data must match the schema of the model. Submit the input data and get a score, or prediction, back. – OR...

The screenshot shows the 'Attrition Prediction' API test interface with the 'Test' tab selected. Below it is a 'Body' section containing a JSON object. The JSON code is as follows:

```
{
  "input_data": [
    {
      "fields": [
        {
          "values": [
            {
              "id": 61900
            }
          ]
        }
      ]
    }
  ]
}
```

A green arrow points to the 'Body' section where the JSON code is pasted.

- 3) You can test the Attrition Prediction Model by inserting this JSON code chunk in the “Enter input data screen” and click on “Predict”. It will return a prediction and probability of the prediction. What makes this significant is that it gives you the ability to use the code to run a single prediction test. In this example we are specifically predicting for employee id “61900” for their likelihood to leave the organization. Consider how this supports audits in a regulatory circumstance.

The screenshot shows the 'Attrition prediction' API test interface with the 'Test' tab selected. Below it is a 'Body' section containing a JSON object. The JSON code is as follows:

```
{
  "input_data": [
    {
      "fields": [
        {
          "values": [
            {
              "EMPID": "61900",
              "TITLE": "Analyst",
              "DEPARTMENT": "IT",
              "FUNCTION": "Software Development",
              "DIVISION": "Engineering",
              "UNION_STATUS": "No Union Member",
              "EMPLOYMENT_CATEGORY": "Full-time Employee",
              "AGE": 35,
              "GENERATION": "Generation X",
              "PAY_SCALE_GROUP": "High Pay Scale Group",
              "GENERATION": "Generation X",
              "ETHNIC_ORIGIN": "Asian",
              "LAST PERFORMANCE RATING": "Good",
              "LAST POTENTIAL RATING": "Good",
              "EMPLOYEE PAY FREQUENCY": "Bi-weekly",
              "EMPLOYEE PAY BASIS": "Hourly Pay Basis",
              "MANAGER_ID": "12345"
            }
          ]
        }
      ]
    }
  ]
}
```

A green arrow points to the 'Body' section where the JSON code is pasted.

- 4) Open a new browser tab within your Firefox browser. Go to <https://raw.githubusercontent.com/cwong79/CPD4.5.0Lab/main/model-payload.json>. Copy the JSON code from here and paste it in the Enter input data box (shown above).

- 5) Once you have copy/pasted the code, select the “Predict” button



Results:

The screenshot shows a window titled "Result" containing JSON code. The code is as follows:

```
0 {
1   "predictions": [
2     {
3       "fields": [
4         "prediction",
5         "probability"
6       ],
7       "values": [
8         [
9           "Active",
10          [
11            0.8888988494873047,
12            0.11110112816095352
13          ]
14        ]
15      ]
16    ]
17 }
18 ]
```

The results will appear in the right window. In this instance the Attrition Model has predicted that this employee will leave the organization with 97.5% accuracy. Note that your results may differ from other participants in the workshop based on environment variances.

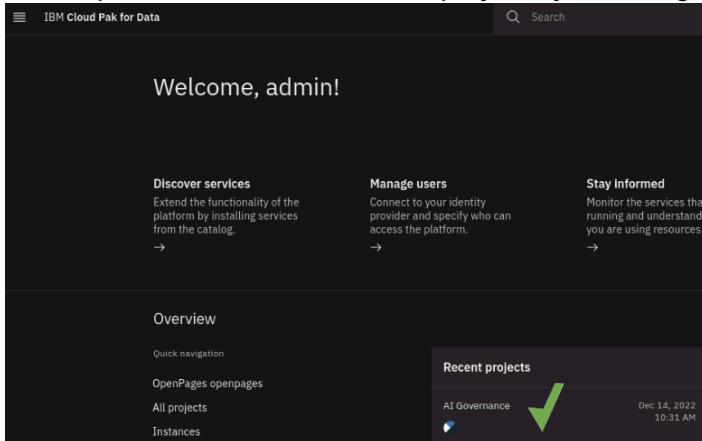
**Summary:** In this deployment space, you can record a models' production lifecycle and manage its interactions with its creator and contributors. Deployment spaces contain deployable assets, deployments, deployment jobs, associated input and output data, and the associated environments. You can use spaces to deploy models and manage your deployments.

As a best practice, all deployed models within an Enterprise should be effectively managed in a single location. This way all risk and governance guidelines can be applied to all AI usage within that Enterprise. CPD automatically packages models within a production space as an available API, eliminating the typical manual process of deploying a containerized model as you would through other methods. The advantages of deploying a model in CPD is twofold. 1) Multiple data access points can be established in CPD through its data fabric capabilities. Therefore, removing manual processes around recording model training and testing metrics. 2) In later steps, you will see how model performance decay impacts model deployment and allows the model owner to create guardrails to rectify the decay through mediation automation.

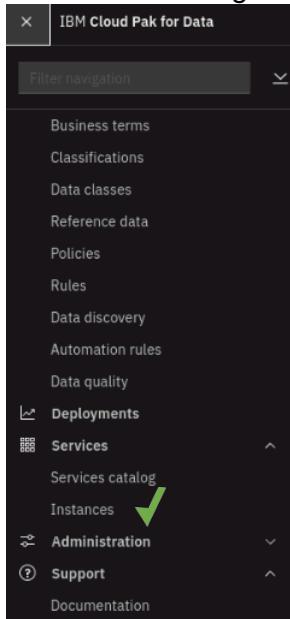
Thus far, we have worked together to 1) Create a collaborative working space 2) Create a model using an automated model creation tool 3) Create a deployment space to manage the model's production. We will now continue our journey by showing CPD's AI Governance capabilities through Openscale.

## 1.8. DB2 Data load

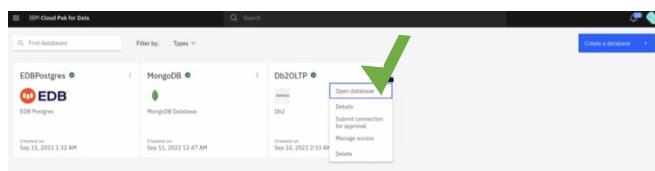
- At the Home Screen, select “IBM Cloud Pak for Data” in the upper left of the window. Then open the “AI Governance” project by selecting it in the “Recent projects” area.



- From the hamburger menu select **Services** then **Instances**

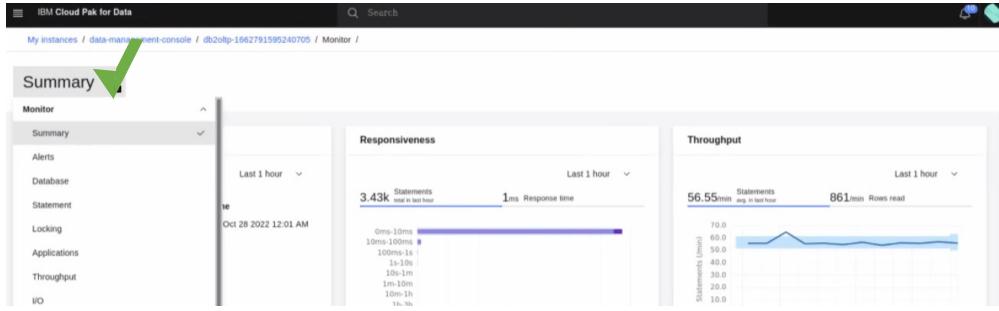


- Select the ellipsis icon within the “Db2OLTP” tile and then select “Open database”



## Lab – IBM Modular Workshop – AI Governance

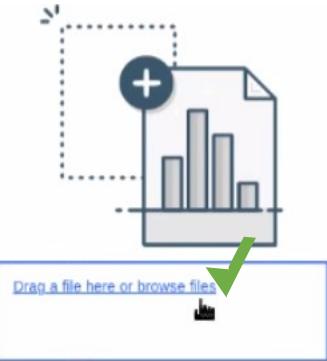
4. Select the “Summary” down arrow



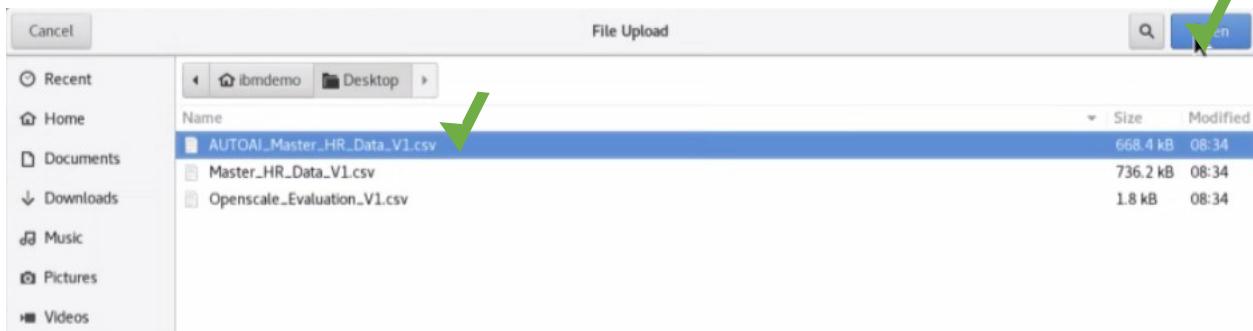
5. Select “Load”, and then “Load Data”



6. Select the “Drag a file here or browse files”



7. Select “AUTOAI\_Master\_HR\_Data\_v1.csv” and then select “Open”



8. Select the “Next” button



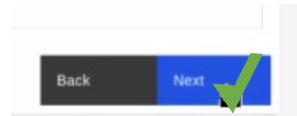
## 9. Select “HR” and then select the “New Table +” button



## 10. Name the table “AUTOAI\_Master\_HR\_Data\_v1” and select the “Create” button



## 11. Select the “Next” button. Note: You may have to wait a minute while the table is created



## 12. Select the Pencil edit icon next to the “SMALLINT” column header under the “EMPID” column header.

EMPID	STATUS	TITLE	DEPARTMENT	FUNCTION	DIVISION	UNION STATUS
1555	Active	Staff Associate	Operations-West	Operations	Product	Non-Union
1562	Terminated	Laborer	Operations-East	Operations	Product	Non-Union
1569	Active	Merchandiser	Sales-Central	Sales	Sales	Non-Union
1576	Active	Laborer	Operations-East	Operations	Product	Union
1583	Active	Merchandiser	Sales-Central	Sales	Sales	Non-Union
1590	Terminated	Merchandiser	Sales-East	Sales	Sales	Non-Union
1597	Active	Merchandiser	Sales-Central	Sales	Sales	Non-Union
1604	Terminated	Merchandiser	Sales-Central	Sales	Sales	Non-Union
1611	Active	Merchandiser	Sales-Central	Sales	Sales	Union
1618	Active	Laborer	Operations-West	Operations	Product	Non-Union

Back Next

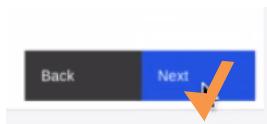
## 13. Select “VARCHAR”, Select “OK”.

## Lab – IBM Modular Workshop – AI Governance

14. Scroll to the Right and perform the same steps on the “AGE” field. Select the “SMALLINT” pencil icon, Select the “Data type” as “VARCHAR” and select the “OK” button.

The screenshot shows a 'Load Data' interface with a table of employee data. An 'Edit column data type' dialog box is open over the table. In the dialog, the 'Data type' dropdown is set to 'VARCHAR'. The 'Maximum number of characters' input field contains '256'. A red arrow points to the 'VARCHAR' dropdown, and another red arrow points to the 'OK' button at the bottom right of the dialog.

15. Select the “Next” button.



16. Select “Begin Load”

The screenshot shows a 'Review settings' screen for loading data from 'OpenScale\_Master\_HR\_Data.csv' into 'HR.OPENSCALE\_MASTER\_HR\_DATA'. It includes sections for 'Summary', 'Option' (warning threshold set to 1000), and 'Define'. At the bottom, there is a 'Back' button and a 'Begin' button highlighted with a green arrow.

17. When the load completes you will see:

The screenshot shows the 'Load details' screen after the job completed successfully. It displays a summary: 3,944 Rows read, 3,944 Rows loaded, and 0 Rows rejected. It also shows the start time (10/26/2022 12:32:44 AM) and end time (10/26/2022 12:32:55 AM). The message 'The data load job succeeded.' is displayed, along with 'No errors'.



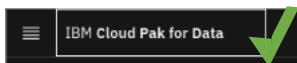




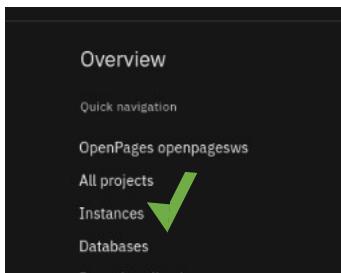
## 1.9 Openscale

A key component of Cloud Pak AI Governance solution is the ability to monitor M/L models for accuracy, fairness, explainability and drift. Through OpenScale's operations console, users can track and measure AI outcomes allowing alignment with business outcomes and organizational KPI's, enabling users to adjust and respond to business changes. The platform provides out-of-the-box metrics as well as the option of customized metrics for tracking model performance. Model outcomes are tracked and measured across its lifecycle, allow it to adapt for changing business needs. CPD detects and mitigates risk and harmful bias, providing business with actionable insights for business development and change plans.

1. Return to the CPD Home screen



2. Select Instances



3. Scroll down in the "Instances" window, find the "openscale-defaultinstance" and select the vertical ellipsis button and then Select "Open"

Instances								
Filter by: Type ▾ Status ▾ <input type="text" value="Find instances"/> New instance +								
Name	Type	Created by	vCPU requests	Memory requests (GiB)	Users	Status	Created on	
data-virtualization	dv	admin	11.50	38.50 Gi	3	green	Sep 10, 2022	i
Cognos Analytics in cpd-instance	cognos-analytics-app	admin	8.40	39.20 Gi	2	green	Sep 10, 2022	i
Db2OLTP Service Instance for db2oltp-1662791595240705	db2oltp	admin	4.10	12.25 Gi	1	green	Sep 10, 2022	i
openscale-defaultinstance IBM Watson OpenScale	aios	admin	-	-	1	green	Sep 9, 2022	⋮
ds-px-default The default DataStage runtime instance	datastage	admin	2.50	6.00 Gi	1	green	Sep 9, 2022	i
ProfHbIntrnl	spark	_internal_profiler_	-	-	1	green	Sep 9, 2022	i

IBM Watson OpenScale

## Insights dashboard

Deployments Monitored	Quality Alerts	Fairness Alerts	Drift Alerts	Custom Alerts
0	--	--	--	--

Filter by Tags ▾ Alert type ▾ Machine learning provider ▾

Q Which deployment are you looking for?

## Components of OpenScale

### Insights Dashboard

The Insights dashboard displays the models that you are monitoring and provides status of model evaluation results.

IBM Watson OpenScale

## Insights dashboard

Insights dashboard

Deployments Monitored	Quality Alerts	Fairness Alerts	Drift Alerts	Custom Alerts
0	--	--	--	--

Filter by Tags ▾ Alert type ▾ Machine learning provider ▾

Q Which deployment are you looking for?

### Explain a transaction

Explanations describe how the model determined a prediction. It lists model utilization on a transactional basis. This inventory contains important factors that led to the predictions, providing confidence in the AI Model.

IBM Watson OpenScale

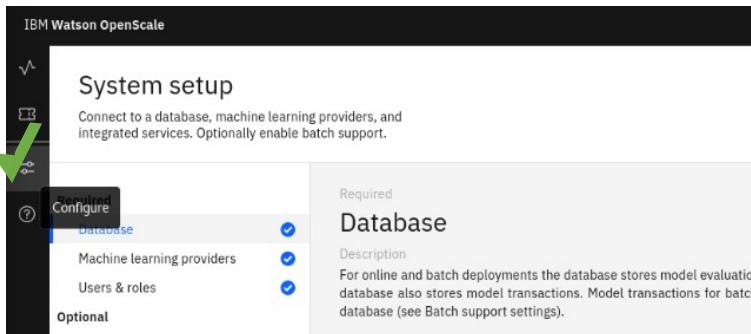
## Find a transaction

Deployed model

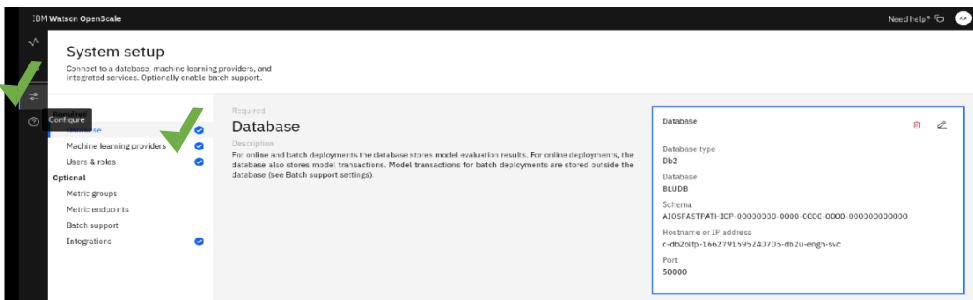
Explain a transaction

## Configure

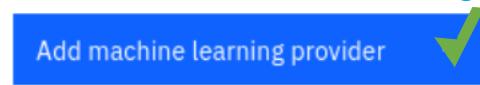
You will use the “Configure” tab to configure storage, machine learning providers, and users.



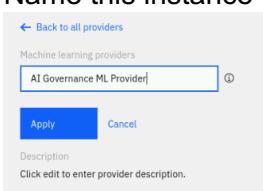
4. Select “[Configure](#)” from the menu on the left. Then Select “[Machine learning providers](#)”. Note the Database information is displayed in the box on the right. This database stores the information of every model run as a transaction capturing information on model payload, predictions, and calculated quality metrics. In this example, we see a Db2 database. However, the database type can be configured based on the database technologies you prefer.



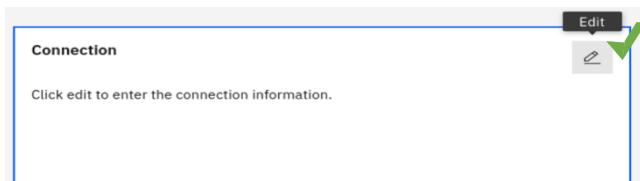
5. Select the “Add machine learning provider” button



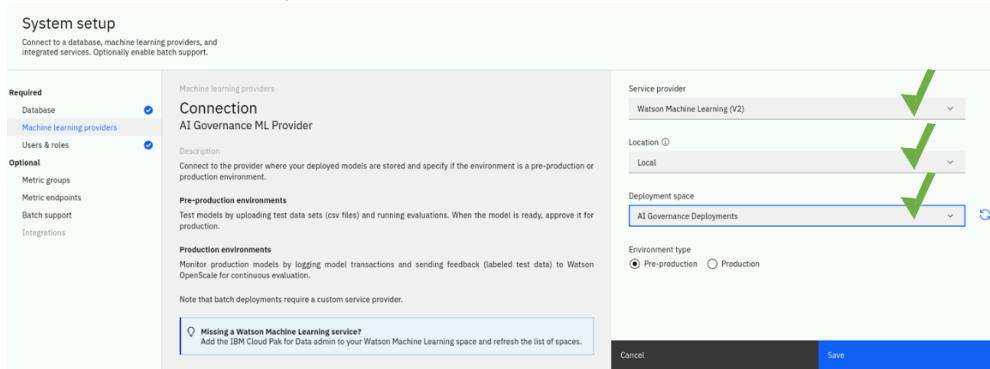
6. In the New Provider screen select the Edit Pencil  by Machine learning providers. Name this instance “AI Governance ML Provider”. Select the “Apply” button.



7. Select the “Edit pencil” in the “Connection” box to the right



8. Select the drop-down arrow in the “Service provider” and select “[Watson Machine Learning \(V2\)](#)”, then select the drop-down arrow in “Location” box and select “[Local](#)”. Then select the drop-down arrow in the “Deployment space” box and select “[AI Governance Deployments](#)”. Finally click the “[Save](#)” button.

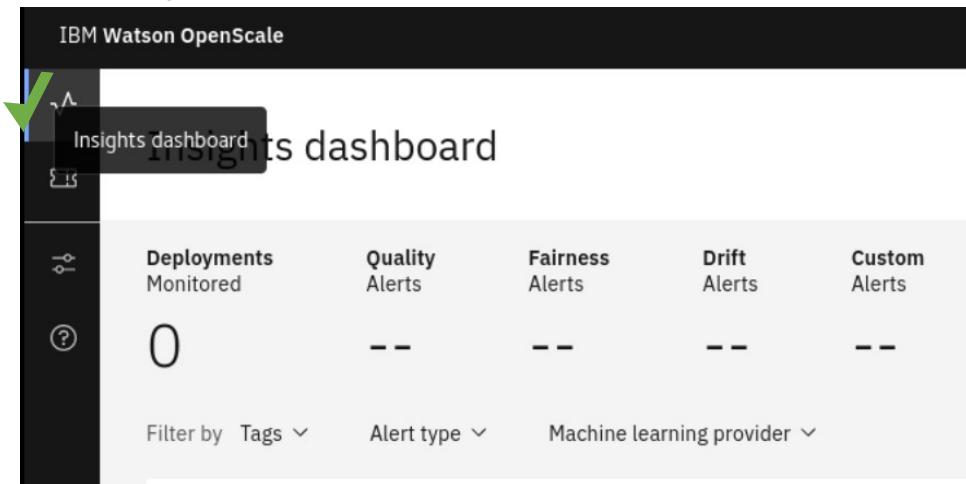


## Machine Learning Providers

You have now created Machine Learning provider access point which is now visible as a tile in the screen you are currently viewing (the “AI Governance ML Provider” tile)

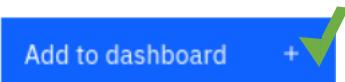
Machine learning providers incorporate artificial intelligence engines, pre-trained machine learning models, and a variety of ML tools designed to create and train custom ML models at scale. Examples of Machine Learning providers include IBM Watson Machine Learning, Amazon SageMaker, Microsoft Azure ML Studio and Microsoft Azure ML Service. In the above activity, we used IBM’s in-house Watson Machine Learning as the service provider.

9. Select the “[Insights dashboard](#)” icon on the left menu to begin building a Model Monitor for our Insights Dashboard

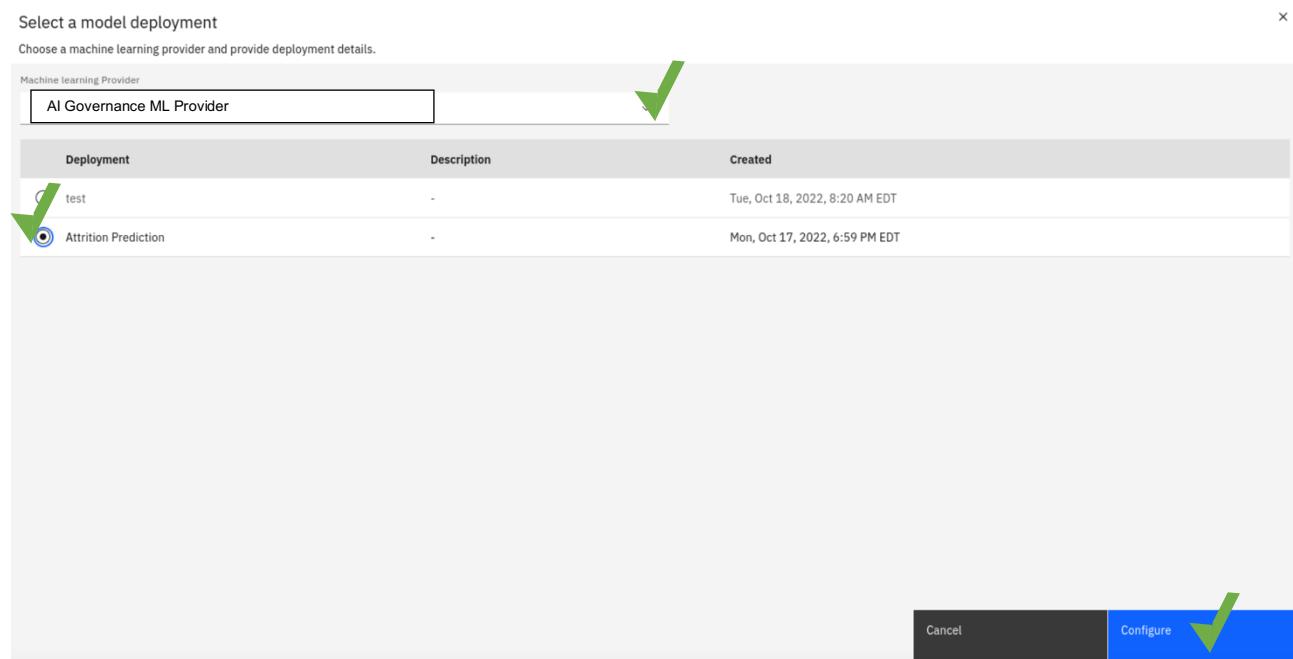


The screenshot shows the IBM Watson OpenScale interface. At the top, there's a dark header with the text "IBM Watson OpenScale". Below it is a navigation bar with icons for "Deployments Monitored" (0), "Quality Alerts" (--), "Fairness Alerts" (--), "Drift Alerts" (--), and "Custom Alerts" (--). The main area is titled "Insights dashboard". It has three dropdown menus: "Filter by Tags", "Alert type", and "Machine learning provider".

10. Select the “[Add to dashboard](#)” button



11. Select the drop-down arrow in the “Machine learning Provider” drop-down box select the “[AI Governance ML Provider](#)” option, then select the “[Attrition Prediction](#)” radio button. Finally, select “[Configure](#)”



The screenshot shows a modal dialog box titled "Select a model deployment". It says "Choose a machine learning provider and provide deployment details." There is a dropdown menu labeled "Machine learning Provider" with "AI Governance ML Provider" selected. Below it is a table with two rows:

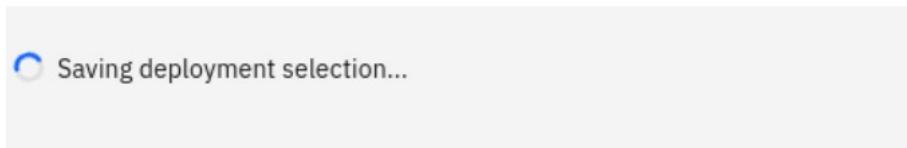
Deployment	Description	Created
test	-	Tue, Oct 18, 2022, 8:20 AM EDT
<input checked="" type="radio"/> Attrition Prediction	-	Mon, Oct 17, 2022, 6:59 PM EDT

At the bottom right of the dialog are "Cancel" and "Configure" buttons, with a green checkmark icon next to the "Configure" button.

This message will appear:

## Select a model deployment

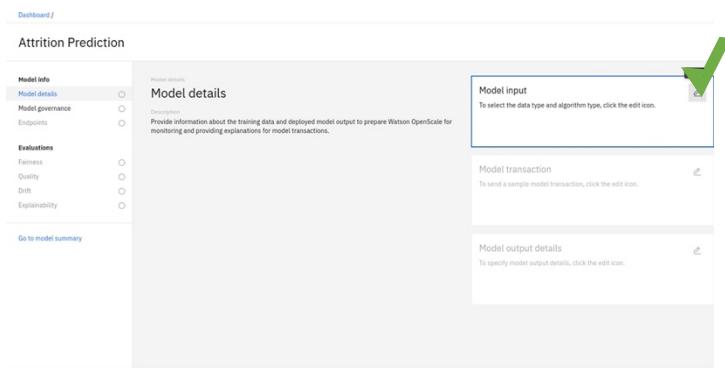
Choose a machine learning provider and provide deployment details.



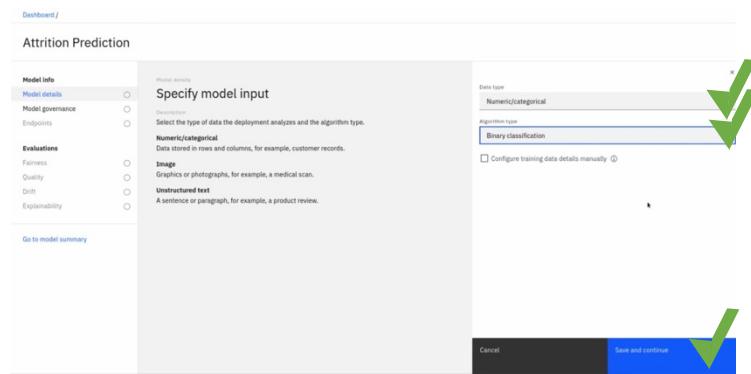
12. Upon completion, select the “Configure monitors” button in the bottom right of the window



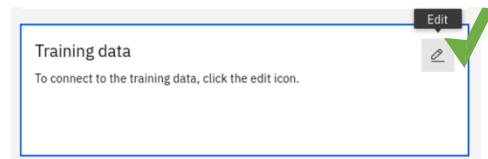
13. In the “Attrition Prediction” window select “Model input” Edit pencil



14. Select **Numeric/categorical** from the drop-down arrow listing under Data Type. Select **Binary classification** from the Algorithm type drop down arrow listing. Select **Save and continue**



15. After the model input selections are saved, Select the **Edit pencil** in the Training data window



16. Under the Storage Type drop down menu, Select **Database or cloud storage** then under Location select “**Db2**”. Now enter the following information in the corresponding fields below:

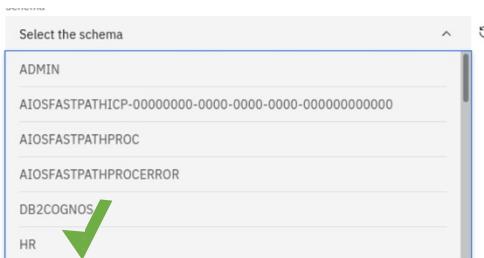
- "Hostname": worker4.amwv11.workshop.tec
- "port": 31067
- "Database": BLUDB
- "username": admin
- "password": cpdaccess

Storage type	Database or cloud storage	✓
Location	Db2	✓
Hostname or IP address	worker4.amwv11.workshop.tec	
Port	31067	✓
Database	BLUDB	✓
Username	admin	✓
Password	*****	✓

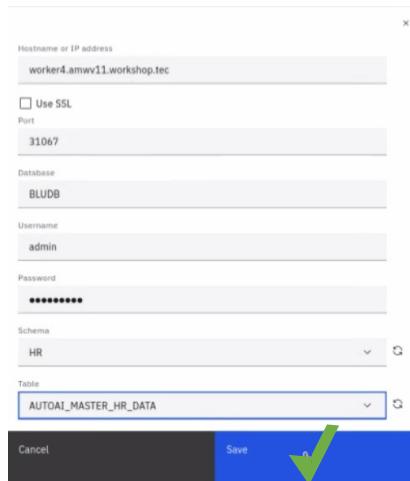
17. Scroll down and Select “[Connect](#)”



18. When the connection is made, the drop-down arrow menu in the schema box will become available. Scroll down within the Select the schema drop down list and select “HR”



19. Select [AUTOAI\\_Master\\_HR\\_Data\\_v1](#) in the select the table list

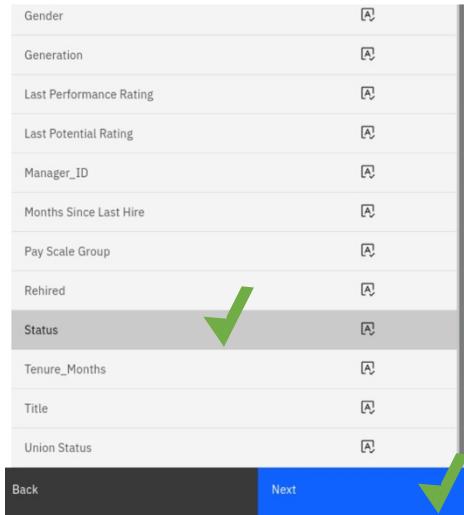


20. Select the [Next](#) button

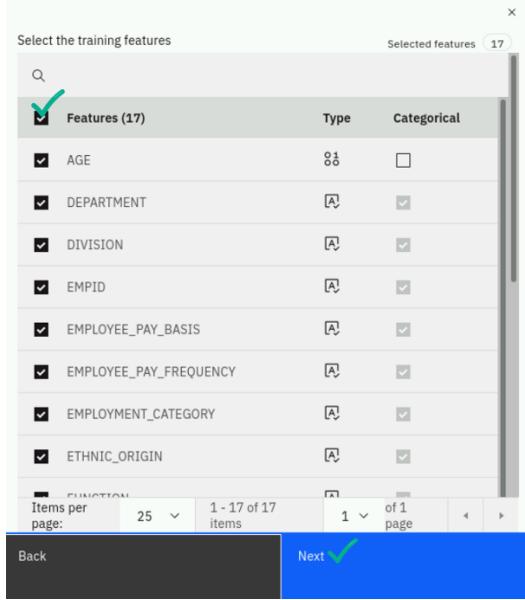


## Lab – IBM Modular Workshop – AI Governance

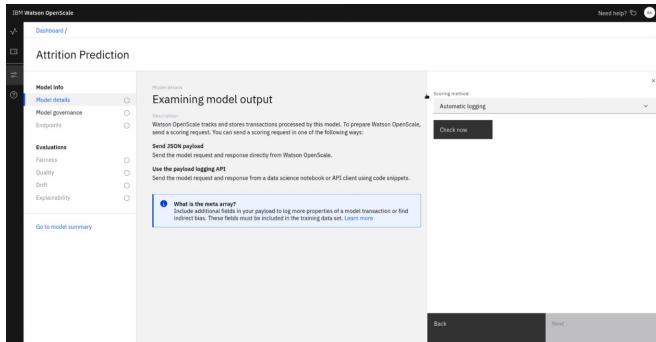
21. Scroll down and select the Label **Status**, then select the **Next** button



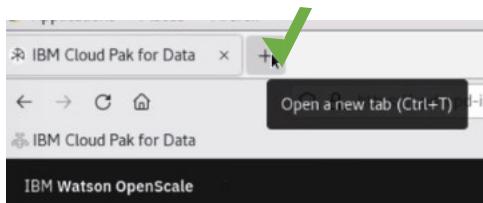
22. In the “**Select the training features**” window, select the check box for all “**Features (17)**” to select all items in the list, then select the **Next** button



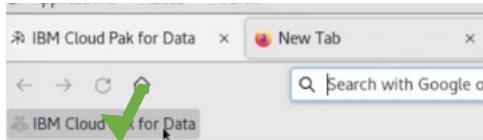
23. You will return to the Attrition Prediction window



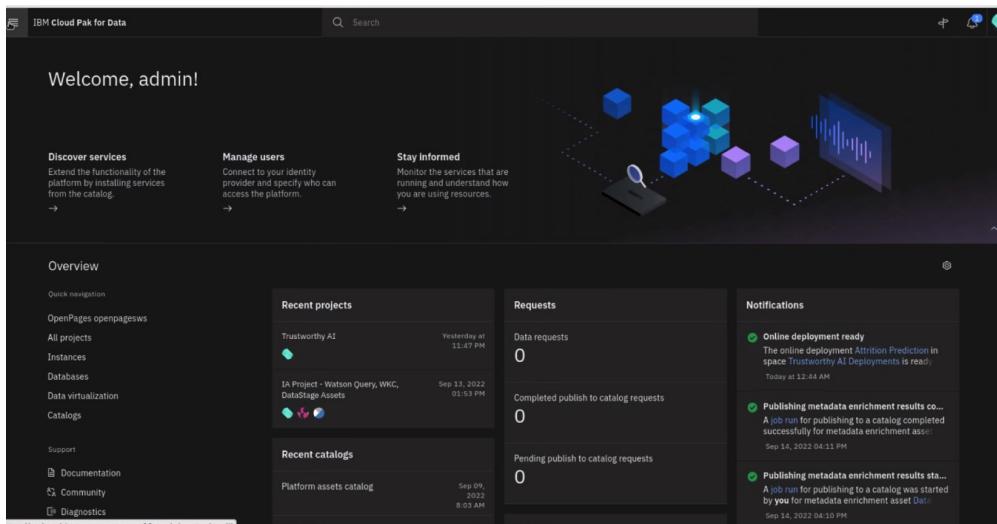
24. You will now open another instance of CPD. Go to the Firefox menu bar and select the + (plus) sign to open a newtab-instance on the browser in your image.  
*Note: Do not open another Firefox tab on YOUR machine.*



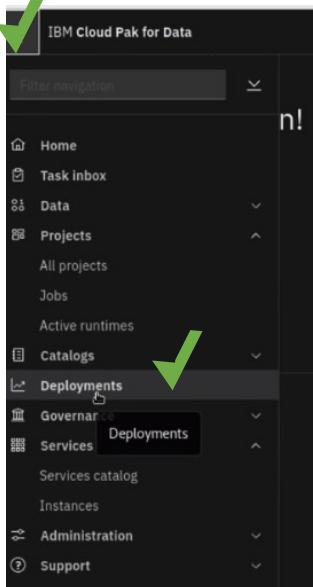
25. Then Select the Firefox bookmark link 'IBM Cloud Pak for Data'.



You will now see a new Cloud Pak for Data Home screen



26. Open the Hamburger menu and select “[Deployments](#)”



27. Select “AI Governance Deployments”

Name	Last modified	Your role	Collaborators	Tags	Online deployments	Jobs
AI Governance Deployments	Jan 4, 2023 1:38 PM	Admin	AA		1	0
AI Governance Deployments	Nov 21, 2022 11:41 AM	Admin	AA		0	1

28. Select the “Deployments” tab and then “Attrition Prediction”

Name	Type	Status	Asset
Attrition Prediction	Online	Deployed	(Champion) Attrition Prediction - P2 XGB Classifier

29. Select the “Test” tab

Attrition Prediction Deployed Online

API reference Test Deployment details

Enter input data

Input Paste JSON

Enter data manually or use a JSON file to populate the spreadsheet. Max file size is 50 MB.

Browse local files Search in space

```
{
  "input_data": [
    {
      "fields": [
        "EMPID",
        "TITLE",
        "DEPARTMENT",
        "FUNCTION",
        "DIVISION",
        "UNION_STATUS",
        "EMPLOYMENT_CATEGORY",
        "AGE"
      ]
    }
  ]
}
```

30. Select the Paste JSON tab and highlight the entire input data as shown below

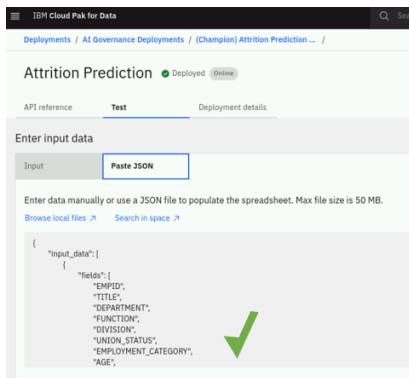
Input Paste JSON

Enter data manually or use a JSON file to populate the spreadsheet. Max file size is 50 MB.

Browse local files Search in space

```
{
  "input_data": [
    {
      "fields": [
        "EMPID",
        "TITLE",
        "DEPARTMENT",
        "FUNCTION",
        "DIVISION",
        "UNION_STATUS",
        "EMPLOYMENT_CATEGORY",
        "AGE"
      ]
    }
  ]
}
```

31. You will now need to [open another Firefox tab](#) and copy the JSON code from <https://raw.githubusercontent.com/cwong79/CPD4.5.0Lab/main/model-payload.json>



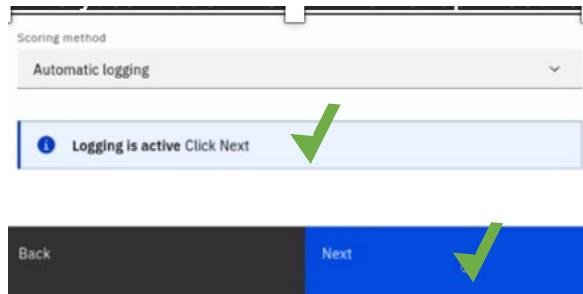
32. After successfully pasting the code – Select the “[Predict](#)” button in the lower right



33. Wait about 60 seconds, and then in the Attrition Prediction window (in your original Firefox tab), Select the “[Check now](#)” button in the right window

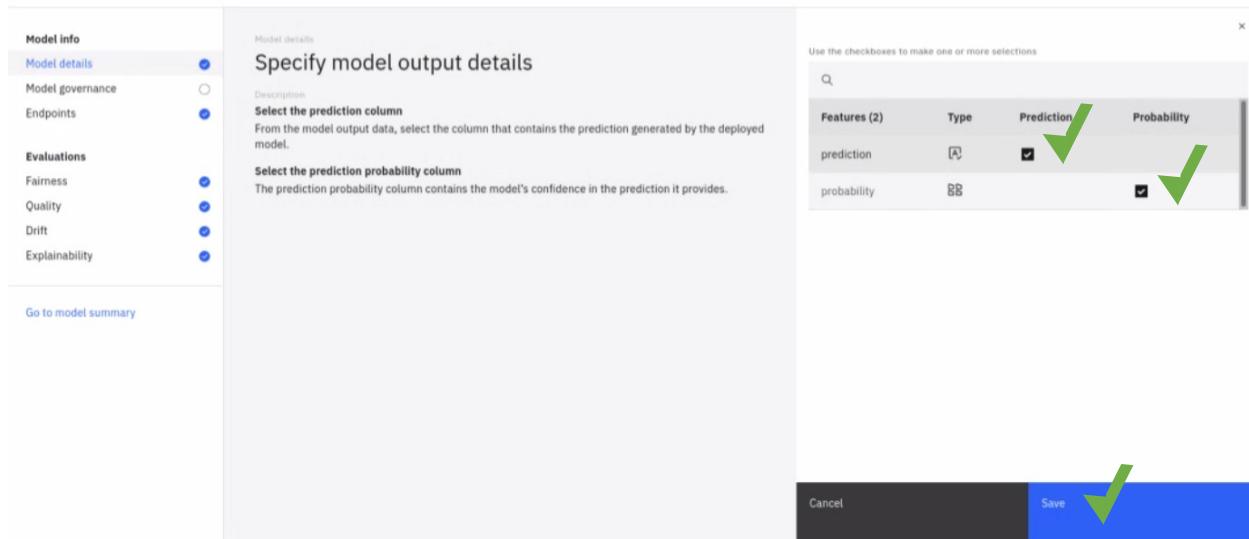


34. Note that a message “Logging is active Click Next” appears in the left pane of the Attrition Prediction window, Select the **Next** button



35. When the Attrition Prediction window appears, select the **Prediction check box** for the “Prediction” feature and select the **Probability check box** for “probability” feature, then **“Save”** button

Attrition prediction



Note that as it is saving, you will see Explainability running/spooling in the left menu



Once it finishes, the running/spooling animation will stop and a blue dot will appear

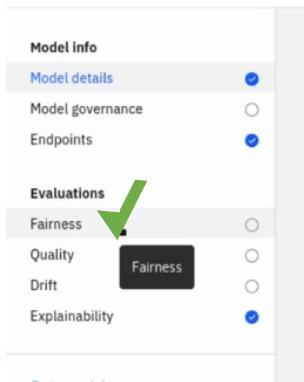


## Fairness

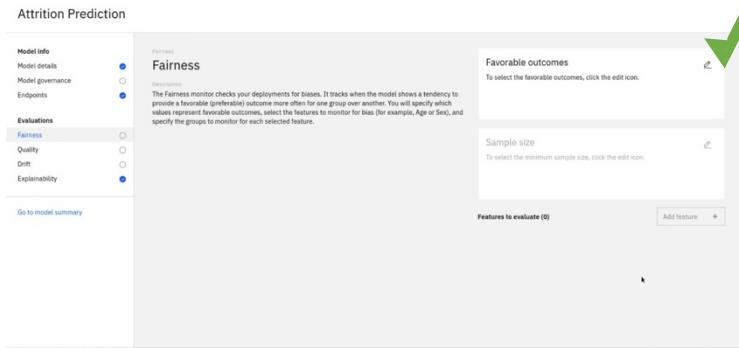
The Fairness monitor checks your deployments for biases. It tracks when the model shows a tendency to provide a favorable (preferable) outcome more often for one group over another. You will specify which values represent favorable outcomes, select the features to monitor for bias (for example, Age or Sex), and specify the groups to monitor for each selected feature.

1. Select “Fairness” from the Evaluations menu

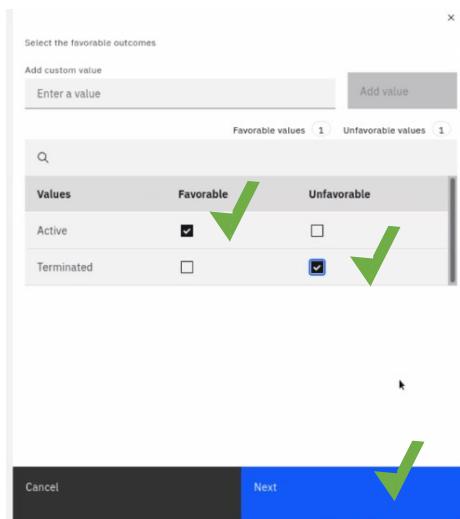
### Attrition Prediction



2. Select the **Edit Pencil** icon in the Favorable outcomes window



3. Select **Favorable** for the Active value and select **Unfavorable** for the Terminated value. Select the **Next** button



- Enter “10” into the “Minimum sample size” and select the **Next** button



Minimum sample size  
10

Maximum sample size (optional)

Cancel Save 

- Select **Gender**, and then select the **Save** button



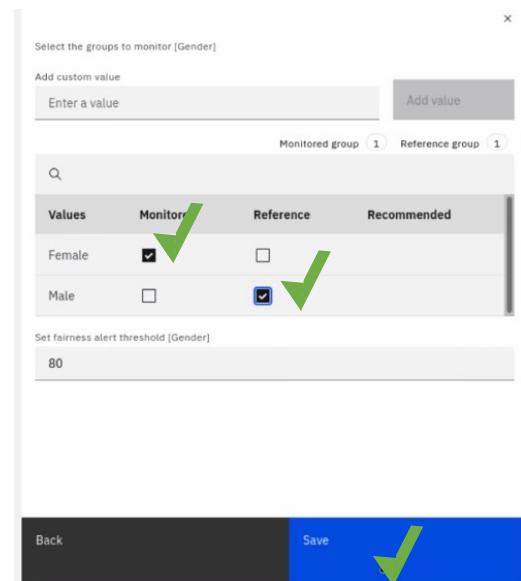
Select one or more fields

	Selected fields
<input type="checkbox"/> AGE	
<input type="checkbox"/> GENERATION	
<input type="checkbox"/> PAY_SCALE_GROUP	
<input checked="" type="checkbox"/> GENDER	
<input type="checkbox"/> ETHNIC_ORIGIN	
<input type="checkbox"/> LAST_PERFORMANCE_RATING	
<input type="checkbox"/> LAST_POTENTIAL_RATING	
<input type="checkbox"/> EMPLOYEE_PAY_FREQUENCY	
<input type="checkbox"/> EMPLOYEE_PAY_BASIS	
<input type="checkbox"/> MANAGER_ID	

Items per page: 25 1 - 17 of 17 items 1 of 1 page

Cancel Save 

- Select **Monitored** for the Female value and **Reference** for Male value. Then select the **Save** button



Select the groups to monitor [Gender]

Add custom value Enter a value Add value

Monitored group 1 Reference group 1

Values	Monitor	Reference	Recommended
Female	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Male	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Set fairness alert threshold [Gender]  
80

Back Save 

## Notice Fairness is Spooling/Running

Attrition Prediction

Model info

- Model details
- Model governance
- Endpoints

Evaluations

- Fairness (selected)
- Quality
- Drift
- Explainability

[Go to model summary](#)

When it completes the spooling stops

Attrition Prediction

Model info

- Model details
- Model governance
- Endpoints

Evaluations

- Fairness (selected)
- Quality
- Drift
- Explainability

[Go to model summary](#)

## Quality

The Quality monitor evaluates how well your model predicts accurate outcomes. It identifies when model quality declines, so you can retrain your model appropriately.

1. Select the **Quality** menu item and then select the **Edit pencil icon** to configure quality monitor in Openscale. As explained on the Quality page, OpenScale can monitor the Quality metric which measures the model's ability to correctly predict outcomes that match labeled data.

Attrition Prediction

Model info

- Model details
- Model governance
- Endpoints

Evaluations

- Fairness
- Quality (selected)
- Drift
- Explainability

[Go to model summary](#)

**Quality**

Description

The Quality monitor evaluates how well your model predicts accurate outcomes. It identifies when model quality declines, so you can retrain your model appropriately.

Note: The Quality metric measures the model's ability to correctly predict outcomes that match labeled data (ground truth) provided by humans. The quality metrics evaluated are standard data science statistics based on model type. [Learn more](#).

Quality thresholds

To select quality threshold values, click the edit icon.

Sample size

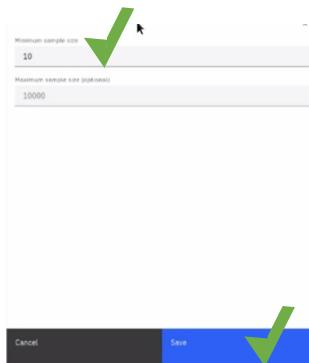
To select the minimum and maximum sample sizes, click the edit icon.

## Lab – IBM Modular Workshop – AI Governance

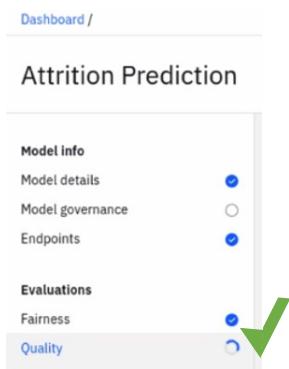
2. This window enables us to enter custom threshold values. For this demo, we will not change the default thresholds. Select the **Next** button



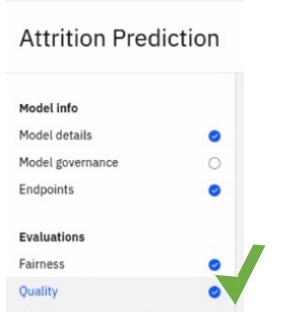
3. Enter **10** and then select the **Save** button



The Quality job will spool and run for a few minutes



When it completes and displays a solid blue dot, we will set up the Drift monitor



## Drift

Drift metrics track the degree of change in accuracy and data consistency based on the accuracy and data consistency at training time.

1. Select **Drift** from the Evaluations menu and then select the **Edit pencil icon** from Drift Model

Attrition Prediction

**Model Info**

- Model details
- Model governance
- Endpoints

**Evaluations**

- Fairness
- Quality
- Drift** (highlighted with a green checkmark)
- Explainability

[Go to model summary](#)

**Drift**

**Drop in accuracy**  
structured binary and multi-class classification models only  
Measures the drop in accuracy from a base accuracy score determined by the training data.

**Drop in data consistency**  
Measures the drop in data consistency by comparing recent model transactions to the training data.

**Drift model**  
To select a drift model training option, click the edit icon.

**Drift thresholds**  
Upper thresholds

**Sample size**  
To select the sample size, click the edit icon.

2. Select **Trust in Watson OpenScale** radio button and select the **Next** button

Attrition Prediction

**Model Info**

- Model details
- Endpoints

**Evaluations**

- Fairness
- Quality
- Drift** (highlighted with a green checkmark)
- Explainability

[Go to model summary](#)

**Drift**

**Train a drift model**

Watson OpenScale can analyze your training data to build a drift detection model and establish an accuracy and data consistency baseline.

**Train in Watson OpenScale**  
You can train the model in Watson OpenScale or you can do it yourself using a custom notebook.

**Train in a data science notebook**  
If you connected your training data to Watson OpenScale and it is less than 500 MB, use this option.  
Run a [custom notebook](#) to generate the drift detection model.

**Training option**

- Train in Watson OpenScale** (highlighted with a green checkmark)
- Train in a data science notebook

**Cancel** **Next** (highlighted with a blue arrow)

For details on Drift monitors, check the [Drift documentation page](#).

3. Set the drift thresholds at the **10%** range for both Drop in accuracy and data consistency, then select the **Next** button

Attrition Prediction

**Model Info**

- Model details
- Endpoints

**Evaluations**

- Fairness
- Quality
- Drift** (highlighted with a green checkmark)
- Explainability

[Go to model summary](#)

**Drift**

**Drift thresholds**

Drift metrics track the degree of change in accuracy and data consistency based on the accuracy and data consistency at training time. There is one type of threshold:

- Upper threshold – Low metric value is better

The drift calculation is based on the environment type.

**Pre-production models**  
Upload labeled test data to determine the accuracy score for the model. This score is compared to the baseline accuracy score established by the model's performance on the training data.

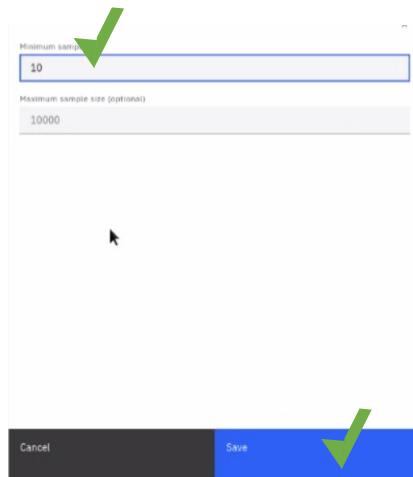
**Production models**  
Watson OpenScale will automatically label incoming model transactions as correct or incorrect using a custom drift model. This labeled data is used to determine an estimated accuracy.

**Upper thresholds**

Drop in accuracy	<input checked="" type="radio"/>	10	%
Drop in data consistency	<input type="radio"/>	10	%

**Back** **Next** (highlighted with a blue arrow)

4. Enter **10** into the Maximum sample size and select the **Save** button

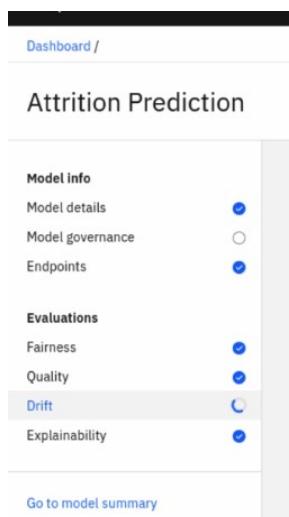


Minimum sample size (optional)  
10

Maximum sample size (optional)  
10000

Cancel Save

Spooling



Dashboard /

## Attrition Prediction

**Model info**

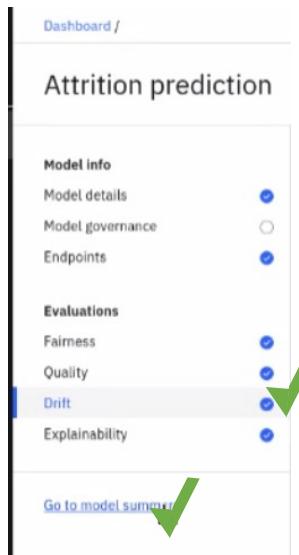
- Model details
- Model governance
- Endpoints

**Evaluations**

- Fairness
- Quality
- Drift**  In progress
- Explainability

[Go to model summary](#)

5. Wait for Drift evaluation to complete, then select the **Go to model summary** link



Dashboard /

## Attrition prediction

**Model info**

- Model details
- Model governance
- Endpoints

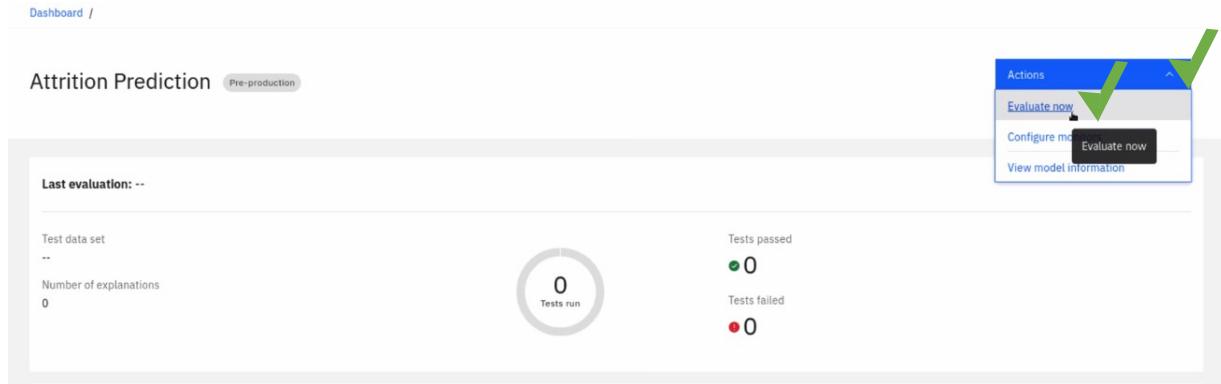
**Evaluations**

- Fairness
- Quality
- Drift**  Completed
- Explainability

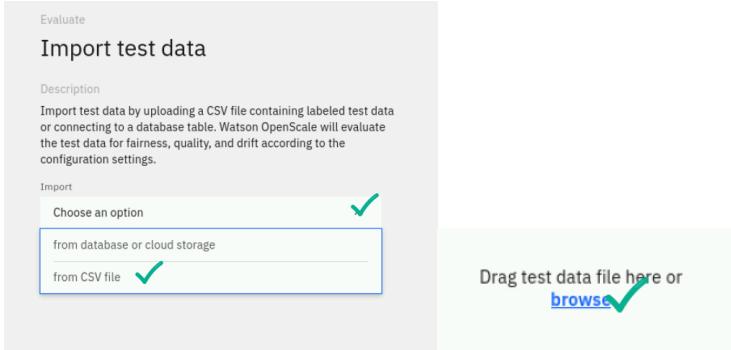
[Go to model summary](#)

## Evaluation

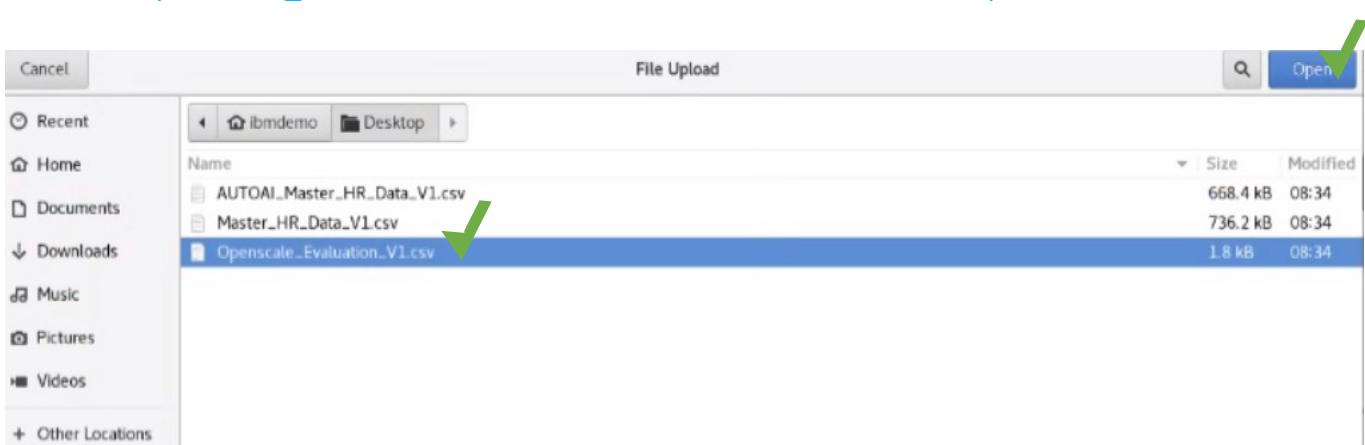
- When you return to the Attrition Prediction window, Select the drop-down arrow in the Actions section, then select Evaluate now



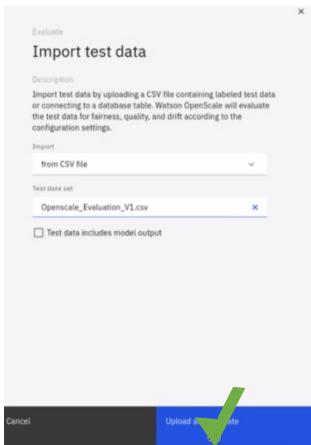
- Select the dropdown on Import Test Data file and select the “from CSV file” link, then Select browse



- Select the “Openscale\_Evaluation-V1.csv” line item and then Select the Open button



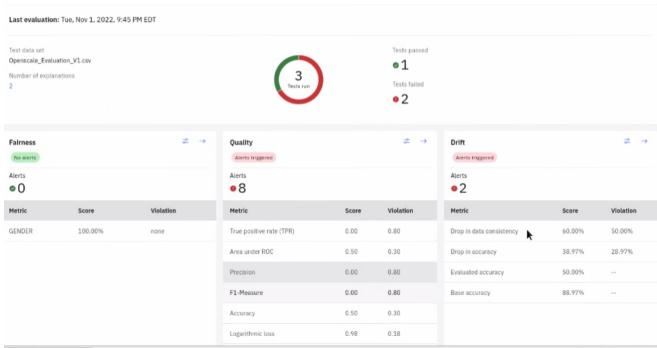
4. Select the [Upload and Evaluate](#) button



You will see the Evaluation running/loading. This can take up to 3 minutes

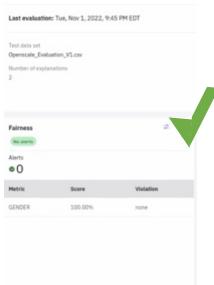


When the Evaluation completes, you will see this screen

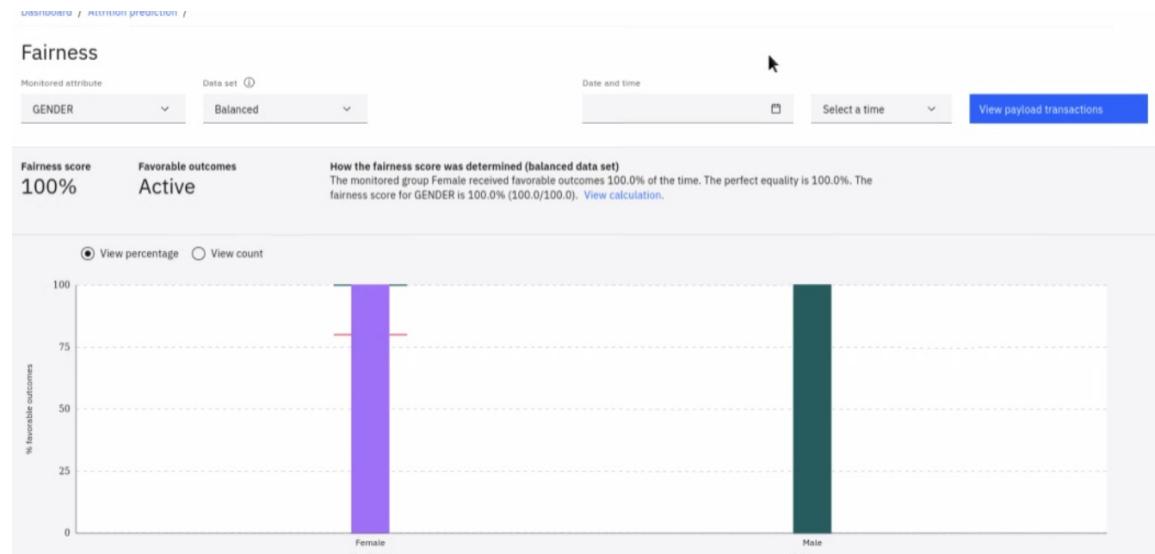


We have successfully completed the OpenScale evaluation for fairness, quality, and drift for our attrition prediction model.

Note that by selecting the right facing arrow within each monitor, additional details regarding that monitors observations are available.



## See details



In production, as your machine learning model is deployed in an end-user application, Cloud Pak for Data will monitor scoring events via APIs, and display a dashboard that business/AI Ops users can leverage to detect undesirable behavior(s) and establish trust in the AI monitors. Openscale uploads evaluation data, runs scoring against it, and compares the model prediction to the labeled result to compute an overall quality score. Once the evaluation completes, you can investigate your results further

You can search for specific model transactions using OpenScale.

## Transaction

1. Select the [Explain a transaction](#) menu button

The screenshot shows the main dashboard of IBM Watson OpenScale. At the top, there's a header with the product name and a 'Dashboard /' link. Below the header, a navigation bar includes 'Attrition prediction' (which is selected), 'Explain a transaction' (highlighted with a green arrow pointing to it), and 'Pre-production'. A green box at the top displays the message: 'Approved Model is approved for production deployment.' Below this, a section shows 'Last evaluation: Tue, Nov 1, 2022, 9:45 PM EDT'. Underneath, there are fields for 'Test data set' (set to 'Openscale\_Evaluation\_V1.csv') and 'Number of explanations' (set to '2'). Further down, there are sections for 'Fairness' (showing 'No alerts') and 'Alerts' (showing '0'). At the bottom, there are tabs for 'Metric', 'Score', and 'Violation'.

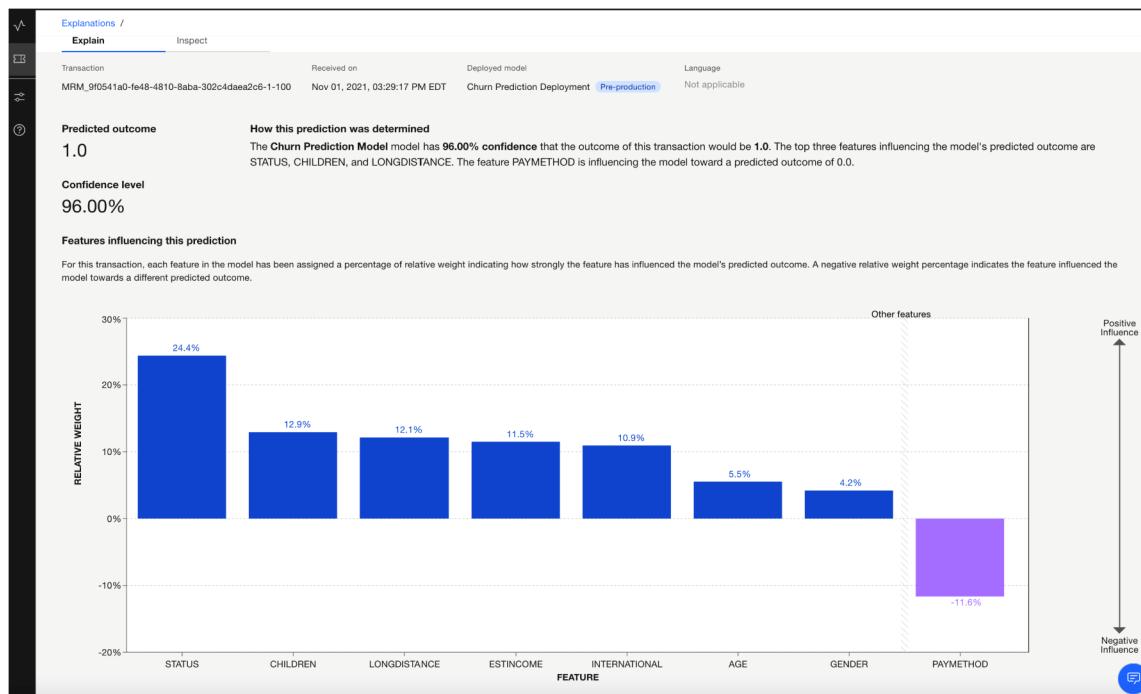
## Lab – IBM Modular Workshop – AI Governance

- On the Transactions page, review the results. Select the [Explain](#) link under the Actions column for one or more of these transactions to better understand how the model reached the output prediction.

The screenshot shows the 'Find a transaction' section of the IBM Watson OpenScale interface. The 'Deployed model' dropdown is set to 'Attrition prediction'. Below it, a table lists three recent transactions. The third transaction, 'MRM\_692fa8f8-59ff-4b70-af2f-3990afb8a0e2-1-2' from Nov 1, 2022, at 9:45:32 PM, has an 'Actions' column containing a blue 'Explain' link, which is highlighted with a green arrow.

Transaction ID	Timestamp	Prediction	Confidence	Actions
MRM_692fa8f8-59ff-4b70-af2f-3990afb8a0e2-1-1	Nov 1, 2022, 9:45:32 PM	Active	61.07%	<a href="#">Explain</a>
MRM_692fa8f8-59ff-4b70-af2f-3990afb8a0e2-1-10	Nov 1, 2022, 9:45:32 PM	Active	88.39%	<a href="#">Explain</a>
MRM_692fa8f8-59ff-4b70-af2f-3990afb8a0e2-1-2	Nov 1, 2022, 9:45:32 PM	Active	87.82%	<a href="#">Explain</a>

- On the Explanations page, review the various features and how they contributed to the output prediction for these records.



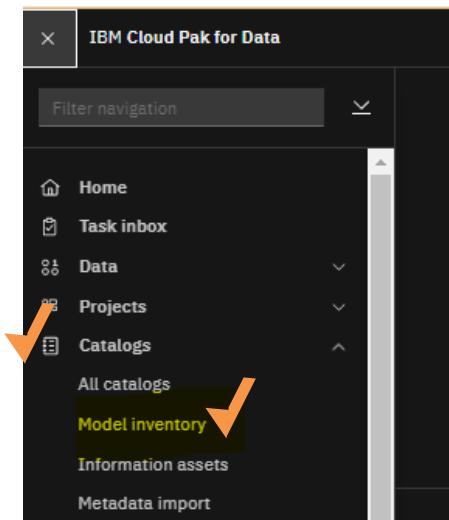
**Summary:** This lab illustrated how you can leverage OpenScale capabilities to deliver AI Governance by running model evaluation to validate that Quality, Fairness, and Drift metrics are within the configured thresholds. Additionally, AIOps engineers, data scientists, and business users can trigger explanation of individual transactions to gain confidence in the predictions of the model.

## 2.0 Factsheets / OpenPages

Information collected in Factsheets is essential in order to comply with various compliance demands. IBM OpenPages offers the ability to properly govern your AI models in a secure environment that allows traceability, automation and regulatory reporting. For example, OpenPages can raise issues based on information collected in Factsheets. Issues can be automatically assigned to different users based on user-definable criteria. These workflows can send emails and reminders to the assignees. All other activity related to the model(s) can be registered in OpenPages, so business users can easily see the inventory of models, their statuses, key metrics, ownership, validations, change requests, attestations and other key activities related to risk and compliance demands.

### Enable OpenPages / Factsheets Integration

- 1. In a new window, open a new CPD tab and select ‘Catalogs’ → ‘Model Inventory’ from the Hamburger.**



- Once it opens click on the Manage tab as seen below and turn on the IBM OpenPages integration.

Model inventory

Model entries Manage

General

Extend the capabilities of the model inventory.

**External model tracking (optional)**

Each external model will be added to the platform assets catalog when evaluated. Once the external model is in the platform assets catalog, you can add it to the model inventory.

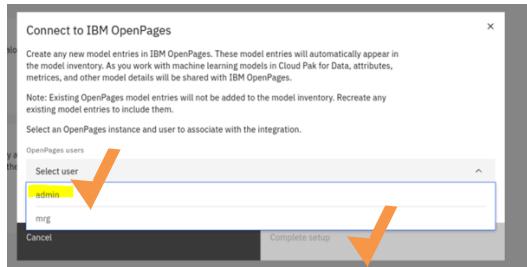
Off

**IBM OpenPages integration**

Model entries created in IBM OpenPages will be automatically added to the model inventory. Work with your OpenPages administrator to customize OpenPages templates to capture the information you need. When active, check for updates to receive any new changes to OpenPages templates.

Sync with IBM OpenPages Off

3. In the Connect to OpenPages screen select user admin from the drop down and click “Complete Setup” once setup is complete click continue.



You have now created a connection between Factsheets (inside Watson Knowledge Catalog) and the OpenPages solution that will allow you to fully govern the models and stay in compliance with regulatory requirements.

## 2.1. Opening the OpenPages instance and exploring the interfaces with other areas of the platform – such as Factsheets and WKC

1. Return to the Cloud Pak for Data Home page, then Select From the quick navigation OpenPages openpagesws

1. You will be taken to the **OpenPages Home Page** which has been configured so you can easily add a new Model Entry. This record is meant to record the description, purpose and business area where the model lives. This simply provides context for the model (or models) that will be governed within OpenPages for compliance and good governance practices.

## Lab – IBM Modular Workshop – AI Governance

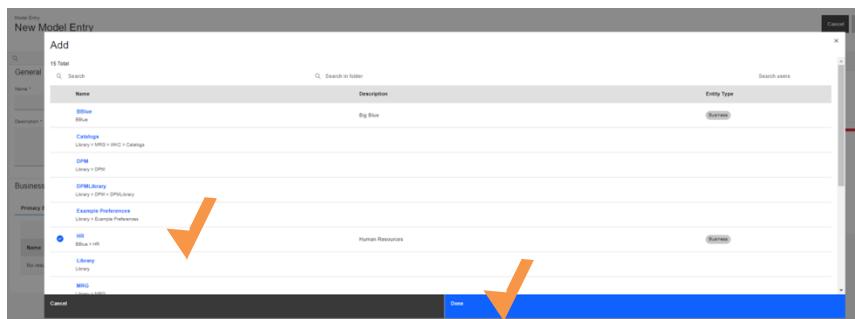
The screenshot shows the IBM OpenPages Home dashboard. It includes sections for Model Entries by Status (1 Approved Model), Model Validation Status (0 Reviews Awaiting Assignment), Model Risk Tier Breakdown (1 Tier 1 Model), and Model Change Management (0 Change Requests). There are also sections for Deployments by Status, My Reviews Underway, and My Active Change Requests. A 'New Model Entry' button is highlighted in yellow at the bottom left. On the left, there's a 'No tasks' panel and a 'Useful Links' sidebar with links to Responsible AI Institute, Model Risk Management - Comptroller's Handbook (OCC), EU Draft AI Regulation, and SR 11-7 Information.

- On the **Model Entry** screen enter in the following required fields: Name; Purpose; Description. Next select a Primary Business Entity in the Business Entity section by clicking on the 'Add' button. Note that all required fields must be entered before the save options is available.

Enter a Model Entry Name, Description, and Purpose.

The screenshot shows the 'New Model Entry' screen. In the General section, the 'Name' field contains 'Champion Attrition Model', the 'Purpose' field contains 'HR - Predict Attrition', and the 'Description' field contains 'AutoAI generated model'. Red arrows point to each of these fields. In the Business Entities section, the 'Primary Business...' dropdown is open, showing a search bar and a list of entities. A red arrow points to the search bar. To the right, a modal window titled 'Model Request Creation' asks for a name, purpose, and description for the model request, with a red arrow pointing to the 'Name' field.

To add a Primary Business Entity, click 'Add' and type HR in the search bar. Click on 'HR' and select 'Done'.



- Once you enter the required fields go ahead and click save.

A new Model Entry record will be created and you will be brought to the Model Entry Task View screen.

Once created, a **background process will create this Model Entry in Watson Knowledge Catalog (WKC)**. This process will take about 10-20 seconds.

4. **Refresh your Browser.** You should expect to see the ‘Third Party Link’ and ‘External ID’ fields populated. If the fields are not populated, please continue to refresh your browser until those fields are populated.

5. Click the hyperlink in the ‘Third Party Link’ field. **This link will take you to the newly created record in the Watson Knowledge Catalog.**

NOTE: you may be required to reenter your login credentials at this point.

The data you entered in OpenPages (Name, Description, and Purpose) is automatically populated in the CP4D Model Inventory Catalog.

From the Model Entry Click on the blue button **‘Add to Project’**. This will allow the catalog entry to be linked to the project(s) we have created as well as the models that have been created under that project.

## Lab – IBM Modular Workshop – AI Governance

The screenshot shows the 'Platform assets catalog' interface. A specific asset entry titled 'Student01-Model\_entry' is selected. The 'Add to project' button is highlighted with a blue arrow. Other visible sections include 'General', 'Governance artifacts', 'Details', and 'About this asset'.

6. In the drop-down for Target select AI Governance and click 'Add' in the lower right.

The screenshot shows the 'Add to project' dialog. The 'Target' dropdown is set to 'TrustworthyAI'. The 'Selected assets' section lists 'Champion Model'. The 'Add' button is highlighted with a red arrow.

7. Let's look at our project. Return to the Cloud Pak Home page, navigate to your Project by clicking on the Hamburger menu and select Projects ⇒ All Projects.

8. From the list, select TrustworthyAI.

The screenshot shows the 'Projects' page. The 'TrustworthyAI' project is selected, highlighted with a red arrow. The project summary indicates it is associated with 'WKC, DataStage Assets'.

9. In the Project record, click on the Assets tab. That will show all relevant assets tied to the project – such as the actual models.

Under Asset Types, select ‘**Saved Models**’ and select one of the Models listed (Champion) Attrition prediction...

The screenshot shows the 'Assets' tab selected in the top navigation bar. On the left, there's a sidebar with 'Asset types' expanded, showing 'Saved models' selected. The main area displays a table titled 'Saved models' with two rows. The second row, which is highlighted with a yellow background, contains the text '(Champion) Attrition Prediction - P3 Snap Random Forest Classifier' under the 'Name' column and '22 hours ago' under the 'Last modified' column.

- 10.** Once the Model is selected, you will be presented with the Factsheets screen about this Model. If this model needs to be fully governed in order to comply with compliance requirements, **it can be flagged to be tracked inside OpenPages**.

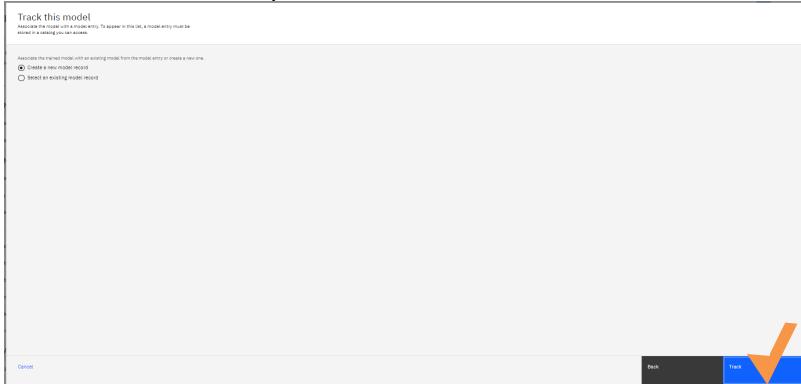
Click ‘**Track This Model**’ – which will create and send the model information to OpenPages.

This screenshot shows the 'Track this model' screen for the selected model. The main panel displays model details like 'Model tracking available', 'Model entry', 'Model entry status', and 'Model information'. The right panel shows a preview of the model's details. At the bottom right of the main panel, there is a yellow button labeled 'Track this model' with a plus sign icon.

- 11.** On the ‘Track this Model’ screen, select the Model Entry from OpenPages that you previously created. **This will create the Model under the Model Entry in OpenPages**.

This screenshot shows the 'Select the related model entry' screen. It lists two entries: 'Champion Attrition Model' and 'GO-56'. The 'Champion Attrition Model' entry is highlighted with a green border. At the bottom right of the screen, there is a blue button labeled 'Next'.

- 12.** Click ‘Create a new model’ and click the ‘Track’ button.



After a few seconds (approx. 30 seconds) you will see a success message telling you “**Tracking Enabled**. Go to OpenPages to update the status of the model.”

In essence, **the model has now been enabled to be fully governed inside OpenPages**. This means that other information can be defined and tracked in OpenPages. This could be periodic model attestations, model metrics, model change management or decommissioning workflows, issues and actions, etc. These activities are normally performed by model managers and business users.

### Let's check it out in OpenPages!!!!

- From the model screen that you're viewing, you can scroll down and click on the IBM OpenPages model link – this will take you to the OpenPages view of this model.

Model entry	TD Test Model
Model entry status	Approved
Model information	
Model description	Description not added
IBM OpenPages model	<b>CHAMPION_DLA_HR_ATTRITION - P3 XGB Classifier</b>
IBM OpenPages model status	Proposed
Tags	
Model ID	ecb02606-63cb-4198-99f7-8e73913eb81e

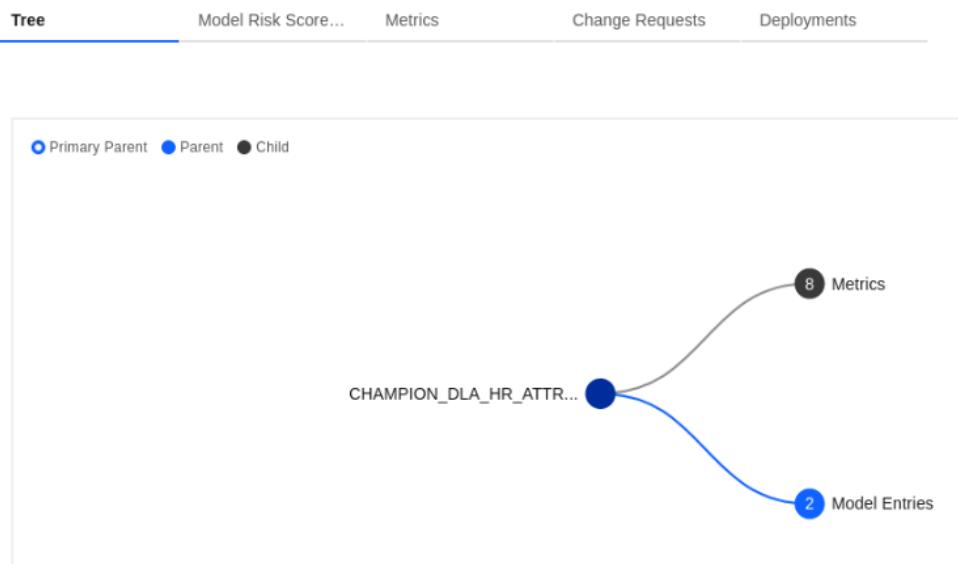
In OpenPages you'll see general information about this model.

Scroll down and you'll see important information that was passed over from Factsheets.

### Model Facts

WKC Name CHAMPION_DLA_HR_ATTRITION - P3 XGB Classifier	WKC Description	Project Name TrustworthyAI	Model Type wml-hybrid_0.1
Third Party Link <a href="https://cpd-cpd-instance.apps.amwv11.workshop.tec/ml/models/ecb02606-63cb-4198-99f7-8e73913eb81e?projectid=6b579d16-0376-4522-aeb0-1304f169012c">https://cpd-cpd-instance.apps.amwv11.workshop.tec/ml/models/ecb02606-63cb-4198-99f7-8e73913eb81e?projectid=6b579d16-0376-4522-aeb0-1304f169012c</a>			
External ID ecb02606-63cb-4198-99f7-8e73913eb81e	Container ID 6b579d16-0376-4522-aeb0-1304f169012c	Container Type project	Input Type
Algorithm XGBClassifier	Prediction Type classification	Software Specification hybrid_0.1	Created By admin
Hyperparameters	Hybrid Pipeline autoai-kb_rt22.1-py3.9	Number of Features 17	
Input Schema auto_ai_kb_input_schema			
Feature	Data type	Description	
FMPID	integer	-	<a href="#">more</a>

You will also see a tree view of all the relevant relationships of the model.



## Including metrics

The screenshot shows the IBM OpenPages interface for managing a model named MOD\_0000021. The 'Metrics' tab is selected in the top navigation bar. The main area displays a table of metrics:

Name	Description	Value	Breach Status	Value Date
MET_0000001	Watson Studio Notebook metric for Roc auc	0.7679402	Not Determined	2/22/2023
MET_0000002	Watson Studio Notebook metric for Balanced accuracy	0.63095915	Not Determined	2/22/2023
MET_0000003	Watson Studio Notebook metric for Precision	0.9181032	Not Determined	2/22/2023
MET_0000004	Watson Studio Notebook metric for Recall	0.9439696	Not Determined	2/22/2023
MET_0000005	Watson Studio Notebook metric for Log loss	-0.33635494	Not Determined	2/22/2023
MET_0000006	Watson Studio Notebook metric for Accuracy	0.87517613	Not Determined	2/22/2023
MET_0000007	Watson Studio Notebook metric for F1	0.9308555	Not Determined	2/22/2023
MET_0000008	Watson Studio Notebook metric for Average precision	0.9165375	Not Determined	2/22/2023

To the right, a sidebar titled 'Model General View' shows a red bar indicating 5 items require attention. It also lists 'All Key Items (5)' with options for Model Owner, Proposal Original Date, Definition Original Date, Development Original Date, and Approval Original Date.

- Further down, you're able to view other key relationships, as well as the ability to create a new issue related to the model. This could be an issue that you see due to a negative metric being received from Factsheets and OpenScale.

### 3. Create an issue against this model.

The screenshot shows the 'Issues and Documents' section of the IBM OpenPages interface. The 'Child Issues' tab is selected. The table header includes 'Name' and 'Priority' columns. A red box highlights the 'New' button in the top right corner of the table header.

4. Create new and fill out the issue creation form with the sample information below. Notice the required fields on the right-hand side of the form. Make sure you enter your user ‘admin’ as the issue owner.

New Issue

CHAMPION\_DLA\_HR\_ATTRITION - P3 XGB Classifier\_ISS\_0000001

\* Description  
Model needs to be re-calibrated due to poor performance on fairness and accuracy.

Priority  
Not Determined

\* Issue Type  
Operating Effectiveness

Deficiency Details ⓘ

Issue Owner \*  
 admin

Identified By Individual  
Search users

Search users

Identified By Group

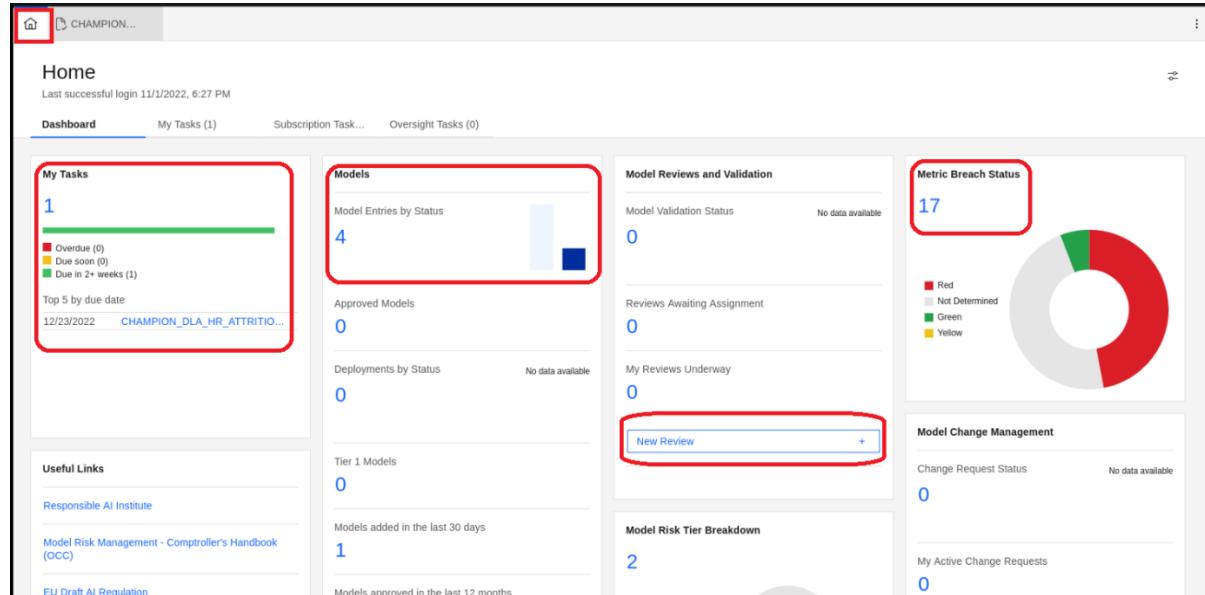
\* Due Date \*  
12/31/2022

Cancel Save

**Required Fields**

- Name \*
- Description
- Issue Type
- Issue Owner \*
- Identified By Individual
- Due Date \*

5. Once saved, the issue will be created and will go through the workflow engine for necessary reviews and approvals. Since you assigned this issue to yourself, you can now click on the house icon on the upper-left corner which will take you to this user's main screen.



The Home Page screen will display important additional information about the model governance functionality in IBM OpenPages. This includes:

**My Tasks** – displays all workflow task notifications assigned to this user. In your case, you should see one task (the issue you created and assigned to yourself). Other assignments will display this as well.

**Models** – provides a list of different searches on the model inventory in the system.

**Model Reviews and Validation** – displays different searches showing validations and reviews with the ability to create New Reviews.

Home dashboards are fully configurable according to each user's needs. In other OpenPages-centric labs we'll explore more of the capabilities around model governance and risk management such as:

- Model Inventory Management
- Model Validations
- Model Change Management
- Model Decommissioning
- Issues and Actions
- Reporting and dashboards

**Congratulations!** You've completed the OpenPages portion of this lab.