

# Lab: Introduction to Watson OpenScale

## Introduction

Businesses today are increasingly certain that AI will be a driving force in the evolution of their industries over the next few years. Yet for every successful AI project, there are many that fail to reach widespread adoption in the business and achieve their expected outcomes. This is partly because the mechanics of AI deployment can be complex, and there are still gaps in skills and tooling that can make it difficult for data science, IT operations, and business teams to work in lockstep. But beyond the operational challenges, there are also much more profound issues of trust and transparency that businesses need to address before they can truly turn AI into a business advantage.

Knowledge workers must be able to trust AI and explain the decisions it helps make before they will incorporate it in their business processes. If AI is a black box that simply takes in data and produces obscure, unexplainable outcomes, then there is no way for the business to judge whether these systems are producing fair, accurate outcomes, or have confidence in AI's ability to augment decision-making. Equally, the business will not be able to explain outcomes to customers, auditors, or compliance teams.

IBM Watson OpenScale is an open platform that helps remove barriers to enterprise-scale AI. Watson OpenScale enables the enterprise to:

- Measure performance of production AI and its impact on business goals
- Track actionable metrics in a single console
- Explain AI outcomes
- Detect and mitigate harmful bias to improve outcomes
- Accept feedback to compute accuracy measures
- Accelerate the integration of AI into existing business applications.

## Objectives

The goal of this lab is to familiarize the user with the features of Watson OpenScale. After completing this lab, you will understand how to:

1. Import a machine learning model
2. Deploy the model
3. Provision Watson OpenScale
4. Configure the payload logging database and Machine Learning provider
5. Score Data
6. Prepare Deployed Model for Monitoring
7. Configure Payload Logging
8. Configure Quality
9. Configure Fairness
10. Configure Drift
11. Submit Feedback and View Quality Metrics

12. Score Data and View Fairness Metrics
13. Explain a Transaction.

## Lab Use Case

Traditional lenders are under pressure to expand their digital portfolio of financial services to a larger and more diverse audience, which requires a new approach to credit risk modeling. Their data science teams currently rely on standard modeling techniques - like decision trees and logistic regression - which work well for moderate datasets and make recommendations that can be easily explained. This satisfies regulatory requirements that credit lending decisions must be transparent and explainable.

To provide credit access to a wider and riskier population, applicant credit histories must expand beyond traditional credit, like mortgages and car loans, to alternate credit sources like utility and mobile phone plan payment histories, plus education and job titles. These new data sources offer promise, but also introduce risk by increasing the likelihood of unexpected correlations which introduce bias based on an applicant's age, gender, or other personal traits.

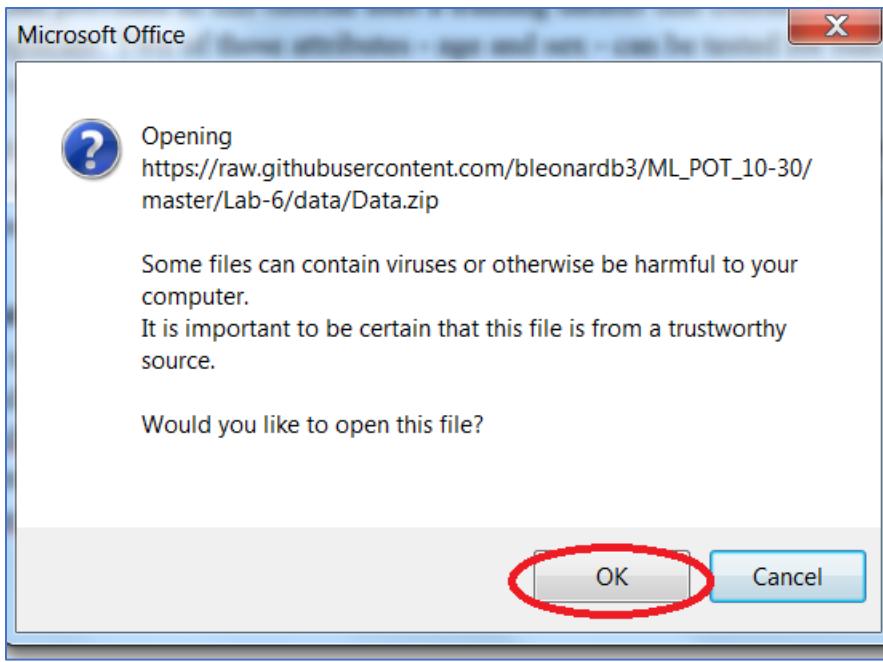
The data science techniques most suited to these diverse datasets, such as gradient boosted trees and neural networks, can generate highly accurate risk models, but at a cost. Such "black box" models generate opaque predictions that must somehow become transparent, to ensure regulatory approval such as Article 22 of the General Data Protection Regulation (GDPR), or the federal Fair Credit Reporting Act (FCRA) managed by the Consumer Financial Protection Bureau.

The credit risk model provided in this tutorial uses a training dataset that contains 20 attributes about each loan applicant. Two of those attributes - age and sex - can be tested for bias. For this tutorial, the focus will be on bias against sex and age.

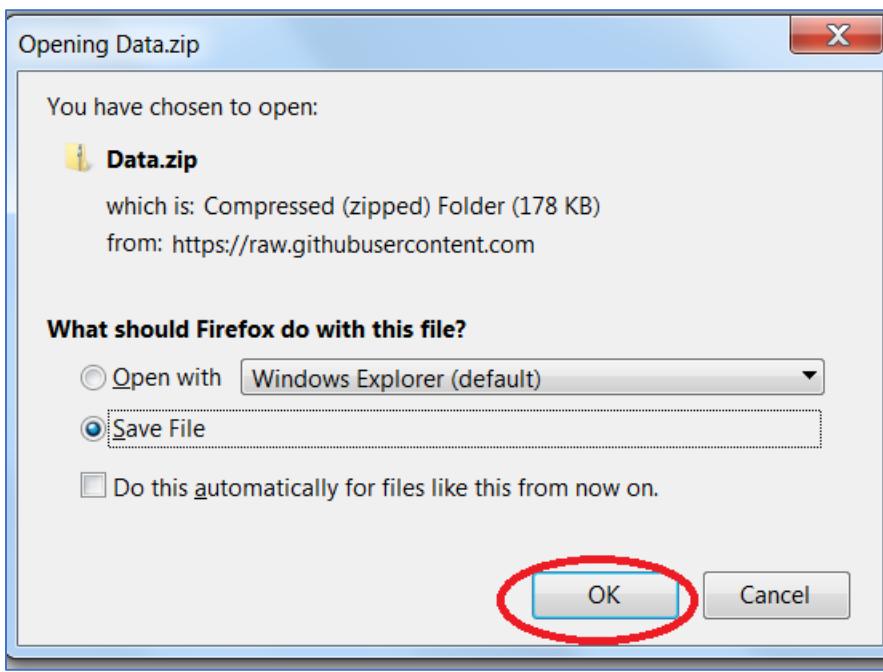
Watson OpenScale will monitor the deployed model's propensity for a favorable outcome ("No Risk") for one group (the Reference Group) over another (the Monitored Group). In this tutorial, the Monitored Group for sex is `female`, while the Monitored Group for age is `19 to 25`.

## Download the Lab Files

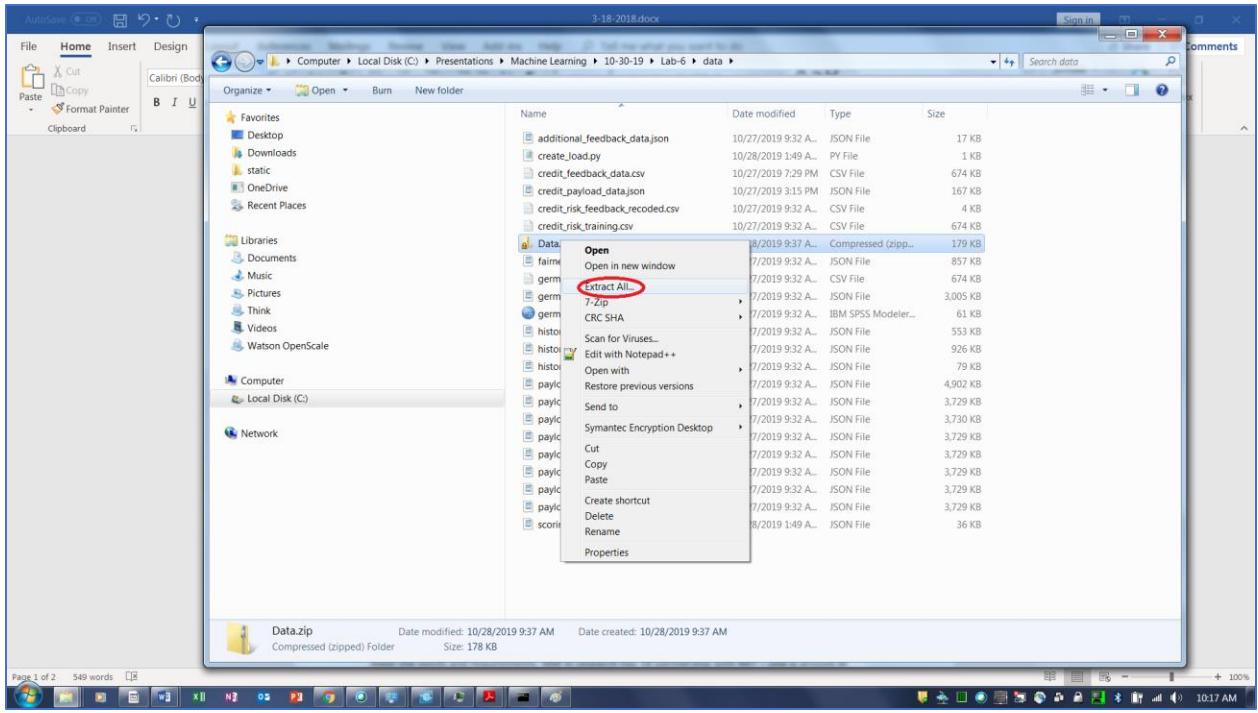
1. Click [here](#) to download the Data.zip file.
  1. `credit_feedback_data.csv`
  2. `credit_payload_data.json`
  3. `german_credit_data_biased_training.csv`
  4. `scoring.json`
2. Click **OK**. Note your browser may not prompt this message.



3. Click **OK**.



4. Navigate to the folder where the file is saved. Select the Data.zip file, right-click, and click **Extract All**.

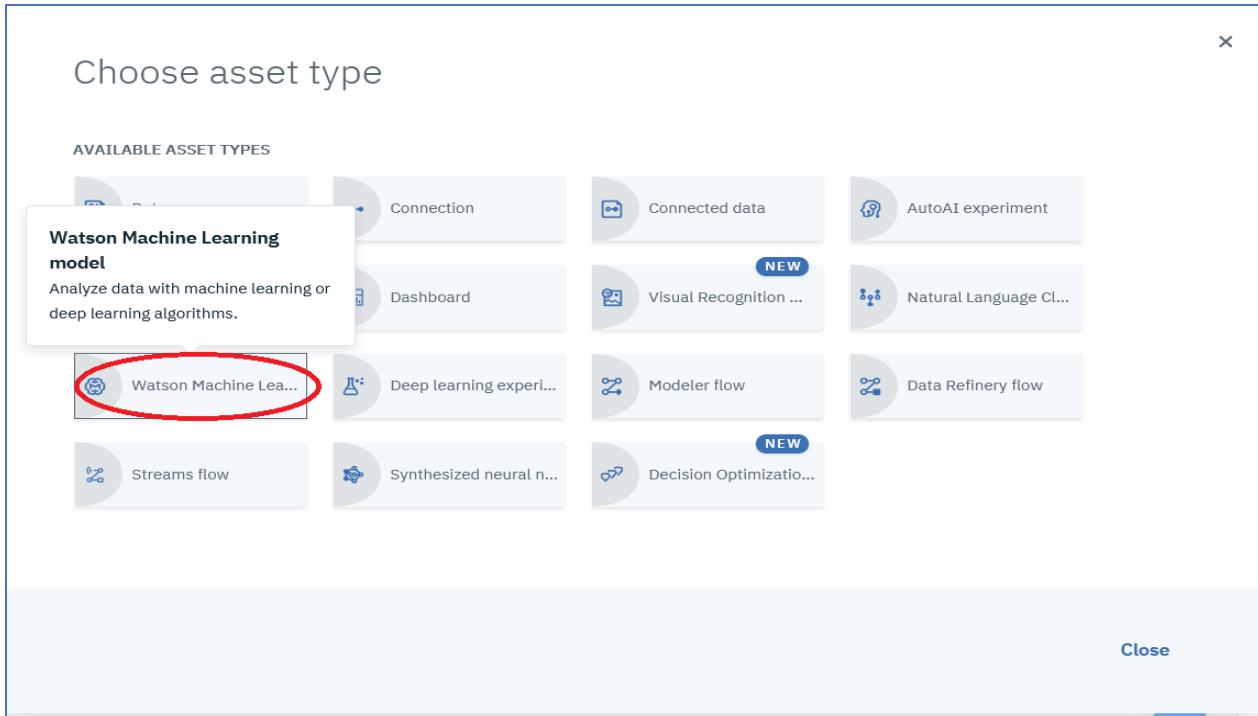


## Import the Credit Risk Model

- From the Watson Studio project, click on **Add to project**.

The screenshot shows the Watson Studio interface with the 'Assets' tab selected. At the top right, there is a blue button labeled 'Add to project' with a plus sign icon, which is circled in red. Below the header, there are tabs for Overview, Assets, Environments, Jobs, Deployments, Access Control, and Settings. Under the 'Assets' tab, there is a search bar and a section titled 'Data assets'. A message at the bottom of this section states: 'You don't have any Data assets yet.'

- Click on **Watson Machine Learning**.



- From the **Import model** page, click on **From sample** for the **Select model type**, click on **Credit Risk**, and then click on **Import**.

## Deploy the Credit Risk Model

- From the **Model** page, click on the **Deployments** tab.

MODEL  
credit-risk

Overview   Evaluation   **Deployments**   Lineage

**Summary**

Machine learning service	WatsonMachineLearning
Model Type	mllib-2.3
Runtime environment	spark-2.3
Training date	27 Oct 2019, 1:11 PM
Label column	Risk
Latest version	fd202530-8cb7-48f1-a172-1575bee01ddd

2. Click on **Add Deployments**.

My Projects / Watson Studio Labs / credit-risk

MODEL  
credit-risk

Overview   Evaluation   **Deployments**   Lineage

NAME	STATUS	DEPLOYMENT TYPE	ACTIONS
Your model is not deployed.			

3. From the **Create Deployment** page, type **credit-risk-deploy** for the **Name**, select **Web service** for the Deployment type, and click on **Save**.

Create Deployment

Define deployment details

Name

Description

Deployment type

Web service

Batch prediction

Cancel **Save**

4. The deployment status should go from **INITIALIZING** to **DEPLOY SUCCESS**. If the status doesn't change after a minute or so, refresh the browser.

The screenshot shows the 'credit-risk' model details page in Watson Studio. The 'Deployments' tab is selected. A table lists one deployment entry:

NAME	STATUS	DEPLOYMENT TYPE	ACTIONS
credit-risk-deploy	DEPLOY_SUCCESS	Web Service	

A red circle highlights the 'DEPLOY\_SUCCESS' status.

## Provision Watson OpenScale.

1. Right-click on the **IBM Watson Studio** label and click on **Open link in New Tab**.

The screenshot shows a browser context menu with the 'Open Link in New Tab' option highlighted by a red circle. The menu also includes other options like 'Open Link in New Window' and 'Open Link in New Private Window'.

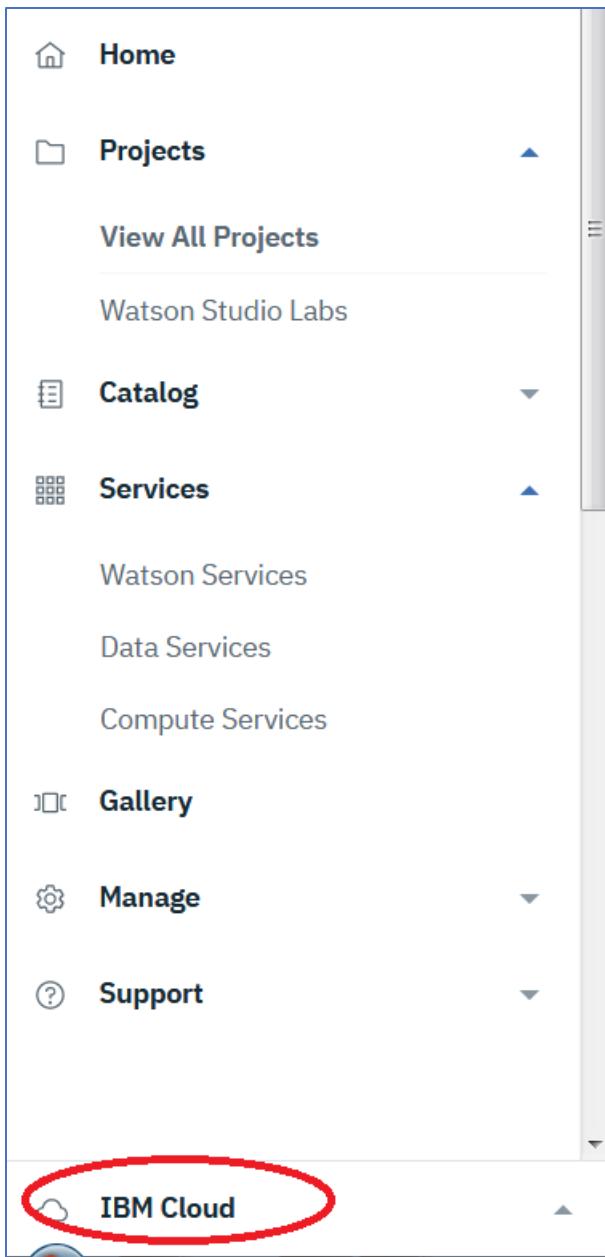
2. Click on the new **Watson Studio** browser tab.

The screenshot shows a browser window with two tabs open, both titled 'IBM Watson Studio'. The second tab is highlighted with a red circle.

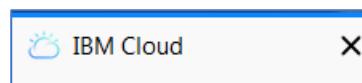
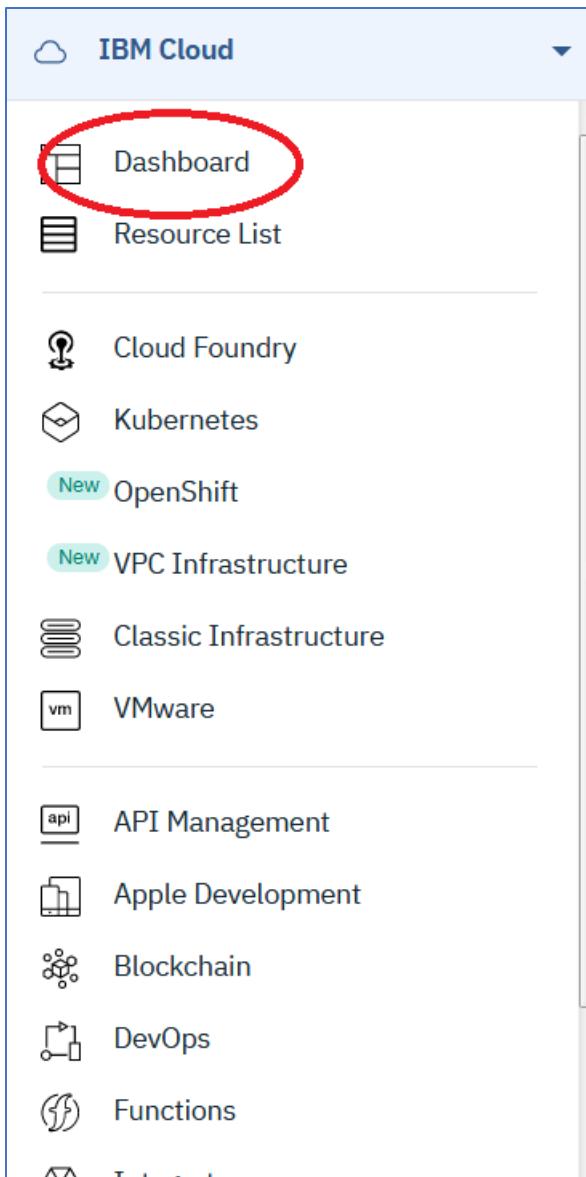
3. Click on the hamburger icon in the top left corner.

The screenshot shows the Watson Studio interface with the hamburger menu icon in the top-left corner highlighted by a red circle. The top navigation bar includes 'Upgrade', 'Felix Doe's Account', and other account-related links.

4. Click on **IBM Cloud**.



5. Click on **Dashboard**.



6. Note that the browser tab has been renamed to IBM Cloud.
7. Click on Catalog



8. Click on AI

# Catalog

## All Categories (50)

VPC Infrastructure

Compute (2)

Containers (1)

Networking

Storage (1)

AI (16) 



Analytics (4)

Databases (3)

Developer Tools (8)

Integration (4)

Internet of Things (1)

Security and Identity (3)

Starter Kits (1)

Web and Mobile (2)

Web and Application (4)

## 9. Scroll down and click on Watson OpenScale.

### Catalog

label:lite

All Categories (50)

VPC Infrastructure

Compute (2)

Containers (1)

Networking

Storage (1)

AI (16) 

Analytics (4)

Databases (3)

Developer Tools (8)

Integration (4)

Internet of Things (1)

Security and Identity (3)

Starter Kits (1)

Web and Mobile (2)

Web and Application (4)

psychological traits.

APIs and services

APIs and services

APIs and services



Tone Analyzer

IBM

Tone Analyzer uses linguistic analysis to detect three types of tones from communications: emotion, social, and language. This insight can th...

APIs and services



Visual Recognition

IBM

Find meaning in visual content! Analyze images for scenes, objects, and other content. Choose a default model off the shelf, or create your own...

APIs and services

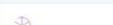


Voice Agent with Watson

IBM

Create a cognitive voice agent that uses Watson services to speak directly with customers using natural language over the telephone

APIs and services



Watson OpenScale

IBM

IBM Watson OpenScale is an enterprise-grade environment for AI infused applications that provides enterprises with visibility into how AI is...

APIs and services

## 10. Click on Create.

The screenshot shows the 'Create' page for Watson OpenScale. At the top, there are tabs for 'Create' and 'About'. Below them, a section for 'Select a region' has 'Dallas' selected. Under 'Select a pricing plan', it shows the 'Lite' plan with its features and pricing. The 'PRICING' column indicates it's 'Free'. On the right side, there's a summary box with details like Region: Dallas, Plan: Lite, Service name: Watson OpenScale-13, and Resource group: Default. A large blue 'Create' button is at the bottom, which is circled in red.

## 11. Click on Launch Application.

The screenshot shows the Watson OpenScale application launch screen. It features a sidebar with 'Manage' and 'Plan' options. The main area displays the resource 'Watson OpenScale-13' with its location as Dallas. Below this is a circular icon with a compass-like symbol. The text 'Watson OpenScale' and 'Welcome to Watson OpenScale, let's get started.' are present. A blue 'Launch Application' button is at the bottom, which is circled in red.

## 12. Make sure to click on No Thanks.



## Welcome to Watson OpenScale

Welcome to Watson OpenScale and AI that is free from bias!

Click Auto setup to get up and running. Let us take care of the rest:

- Set up a live fully-functional demo environment that gets you using the system hands-on.

No thanks

Auto setup

## Setup System

1. In the system setup, we need to set up a database to collect the payload logging data. We also need to specify which deployed model will be monitored.
2. Click on **Use the free Lite plan database** for **Select your database** and click on **Save**.

## System setup

Database

Machine learning providers

### Select your database

Watson OpenScale uses a PostgreSQL or Db2 database to store model deployment output and retraining data. A free database is available for Lite plan users to get started. Alternatively, you can use an existing database or purchase a new one.

Use the free Lite plan database

Use existing or purchase a new database

Note: The free Lite plan database is not GDPR compliant. If your model processes personally identifiable information (PII), you must purchase a new database or use an existing database that does conform to GDPR rules. [Learn more](#).



Save

Back

### 3. Click on Select Provider.

Database saved

You can now select a machine learning provider.

Select Provider

### 4. Click on Add machine learning provider.

## System setup

Database

Machine learning providers

### Machine learning providers

Watson OpenScale connects to models and deployments stored in a machine learning service.

Add machine learning provider +

### 5. Click on Watson Machine Learning.

System setup

Database  Machine learning providers

Select your machine learning service provider

Watson OpenScale connects to AI deployments stored in Watson Machine Learning, third-party, and custom environments.

 Watson Machine Learning	 Custom Environment
 Amazon SageMaker	 Microsoft Azure ML Studio
	 Microsoft Azure ML Service

6. Click on **WatsonMachineLearning** for the **Watson Machine Learning** service, type in **Watson Machine Learning Instance** for the **Service provider instance name**, and then click **Save**.

System setup

Database  Machine learning providers

Select your Watson Machine Learning instance

Watson OpenScale connects to AI deployments stored in your Watson Machine Learning service. Select a Watson Machine Learning instance below.

Watson Machine Learning service

Service provider instance name

Description

Select a different location | Sign up for a new instance

Back Save

## Score Data

Before proceeding with the monitor configuration, we need to send scoring data to the deployed model in order to generate payload logging data that the monitors can consume. We will use the credit\_risk\_data.json file as sample data that Watson Studio will submit to the deployed model.

1. Click on the **Watson Studio** Browser tab
2. You should be back at the **credit-risk Model** page. Click on **credit-risk-deploy**.

My Projects / Watson Studio Labs / credit-risk

MODEL  
credit-risk

Overview Evaluation Deployments Lineage

Add Deployment

NAME	STATUS	DEPLOYMENT TYPE	ACTIONS
credit-risk-deploy	DEPLOY_SUCCESS	Web Service	

3. Click on the **Test** tab.

credit-risk-deploy

Overview Implementation Test

Deployment

Name	credit-risk-deploy
Type	Web Service
Deployment ID	203b492f-f9ca-4166-95c9-a93e3018f091
Status	DEPLOY_SUCCESS
Asset type	model
Asset name	credit-risk
Machine learning service	WatsonMachineLearning
Created	27 Oct 2019 01:18pm
Last modified	27 Oct 2019 03:20pm

4. Click on the icon to accept input as JSON.

credit-risk-deploy

Overview Implementation Test

Enter input data

Provide input data as JSON

Paste the request payload here

Predict

5. Copy the file contents of **credit\_payload\_data.json** into the **input data** area and click on **Predict**.

The screenshot shows a web-based application titled "credit-risk-deploy". The "Test" tab is active. In the "Enter input data" section, there is a JSON code editor containing the following content:

```
{  
  "fields":  
    ["CheckingStatus","LoanDuration","CreditHistory","Loa  
nPurpose","LoanAmount","ExistingSavings","Employme  
ntDuration","InstallmentPercent","Sex","OthersOnLoan  
","CurrentResidenceDuration","OwnsProperty","Age","I  
nstallmentPlans","Housing","ExistingCreditsCount","Jo  
b","Dependents","Telephone","ForeignWorker"],  
  "values":  
    [
```

At the bottom of the JSON editor, there is a blue "Predict" button. This button is circled with a red oval.

6. The results should appear as below.

## credit-risk-deploy

Overview    Implementation    **Test**

### Enter input data

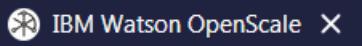
```
{  
  "fields":  
    ["CheckingStatus", "LoanDuration", "CreditHistory", "Loa  
    nPurpose", "LoanAmount", "ExistingSavings", "Employme  
    ntDuration", "InstallmentPercent", "Sex", "OthersOnLoan  
    , "CurrentResidenceDuration", "OwnsProperty", "Age", "I  
    nstallmentPlans", "Housing", "ExistingCreditsCount", "Jo  
    b", "Dependents", "Telephone", "ForeignWorker"],  
  "values":  
}
```

Predict

```
{  
  "fields": [  
    "CheckingStatus",  
    "LoanDuration",  
    "CreditHistory",  
    "LoanPurpose",  
    "LoanAmount",  
    "ExistingSavings",  
    "EmploymentDuration",  
    "InstallmentPercent",  
    "Sex",  
    "OthersOnLoan",  
    "CurrentResidenceDuration",  
    "OwnsProperty",  
    "Age",  
    "InstallmentPlans",  
    "Housing",  
]
```

## Prepare deployed model for monitoring

1. Switch back to Watson OpenScale by clicking on the Watson OpenScale browser tab.



2. Click on **Go to Dashboard**

Setup is complete

You are now ready to add model deployments to your dashboard. If you need to reset your database or machine learning provider you can return to this screen by clicking the **Configure** icon in the left navigation bar.

[View providers](#)

[Go to Dashboard](#)

3. Click on **Add**.

Insights Dashboard

Model Monitors  
0

Deployments  
Monitored  
0

Quality  
Alerts  
0

Fairness  
Alerts  
0

Drift  
Alerts  
0

Add a deployed model to get started.

[Add](#)

4. Click on **Watson Machine Learning Instance** for the **Machine learning Provider**, click on **credit-risk-deploy** for the **Deployment**, and click **Configure**.

## Select a model deployment

Select the deployment you want to monitor.

### Machine learning Provider

Watson Machine Learning Instance

Deployment	Description	Created
credit-risk-deploy	-	Sun, Oct 27, 2019, 1:18 PM EDT

Cancel

Configure

5. Click on **Configure monitors**.

Selections saved.

✓ Done. Click **Configure monitors** to set up your monitors.

Close

Configure monitors

## Configure Payload Logging

You must provide information about your model and training data to configure payload logging.

1. Click on **Numeric/categorical** for **Data type**, click on **Binary classification**, and click on **Save**.

Dashboard / Configure

credit-risk-deploy

<a href="#">Payload logging</a> <a href="#">Model details</a> <a href="#">Quality</a> <a href="#">Fairness</a> <a href="#">Explainability</a> <a href="#">Drift</a>	<h3>Specify type of input</h3> <p>Select the type of data the deployment analyzes and the algorithm type.</p> <p><b>Data type</b> ⓘ Numeric/categorical</p> <p><b>Algorithm type</b> Binary classification</p> <p><b>Save</b></p>
--	---

- Click on **Model details**. Since we already sent scoring requests to the deployed model, the Logging should be activated successfully.

Dashboard / Configure

credit-risk-deploy

<a href="#">Payload logging</a> <span style="color: green;">✓</span> <a href="#">Model details</a> <span style="color: green;">✓</span> <a href="#">Quality</a> <a href="#">Fairness</a> <a href="#">Explainability</a> <a href="#">Drift</a>	<h3>Payload logging</h3> <p>Watson OpenScale automatically logs payloads for connected Watson Machine Learning Models. To configure monitors, send an initial scoring request to the model using Watson Studio or the Watson Machine Learning API and click the I'm finished button.</p> <p>Automatic payload logging requires the Watson Machine Learning and Watson OpenScale instances to be located in the same region or Cloud Pak for Data cluster.</p> <p><span style="color: blue;">i</span> <b>Logging activated successfully.</b> Proceed by completing the model details step.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Details</th> <th style="text-align: right;">View API Specification   Download</th> </tr> </thead> <tbody> <tr> <td>Deployment name</td> <td colspan="2">credit-risk-deploy</td> </tr> <tr> <td>Data type</td> <td colspan="2">Numeric/categorical</td> </tr> <tr> <td>Algorithm type</td> <td colspan="2">Binary classification</td> </tr> <tr> <td>Datamart ID</td> <td colspan="2">52876bf1-a1bc-4e53-af1a-4dbf3dd7baef</td> </tr> <tr> <td>Feedback table name</td> <td colspan="2">Feedback_a9df74f8-869d-4896-9880-cd6671065daa</td> </tr> </tbody> </table>	Details		View API Specification   Download	Deployment name	credit-risk-deploy		Data type	Numeric/categorical		Algorithm type	Binary classification		Datamart ID	52876bf1-a1bc-4e53-af1a-4dbf3dd7baef		Feedback table name	Feedback_a9df74f8-869d-4896-9880-cd6671065daa	
Details		View API Specification   Download																	
Deployment name	credit-risk-deploy																		
Data type	Numeric/categorical																		
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Datamart ID	52876bf1-a1bc-4e53-af1a-4dbf3dd7baef																		
Feedback table name	Feedback_a9df74f8-869d-4896-9880-cd6671065daa																		

- We need to provide information about the model deployment and training data to prepare Watson OpenScale for monitoring and providing explanations for model transactions. Click **Begin**.

Dashboard / Configure

credit-risk-deploy

Payload logging

Model details

Quality

Fairness

Explainability

Drift

**Model details**

Provide information about the model deployment and training data to prepare Watson OpenScale for monitoring and providing explanations for model transactions.

**Begin**

4. Click on **Manually configure monitors** and click **Next**.

Dashboard / Configure

credit-risk-deploy

Payload logging

Model details

Quality

Fairness

Explainability

Drift

**Configure monitors**

Manually configure monitors using a guided walkthrough or upload training data distribution generated by running a custom notebook.

**Manually configure monitors**

Upload training data distribution

Monitor configuration requires information about the training data. Manual configuration requires a connection to the training data for analysis. If you prefer to analyze the training data without providing a connection, choose the upload option.

Back **Next**

5. The training data is stored in a DB2 on Cloud Warehouse. The credentials for this warehouse are:

Hostname: dashdb-entry-yp-dal09-10.services.dal.bluemix.net

Password: e7PZ9AWh\_\_hb

Username: dash14512

Database: BLUDB

Port: 50001

Enter the values in the corresponding fields and click on **Test** to check on the status of the connection. If successful, click on **Next**, if not, double check on the values entered.

Dashboard / Configure

credit-risk-deploy

Payload logging ✓

Model details ✓

Quality

Fairness

Explainability

Drift

Location: Db2

Hostname or IP address: dashdb-entry-yp-dal09-10.services.dal.bluemix.net

SSL port: 50001

Database: BLUDB

Username: dash14512

Password: \*\*\*\*\*

Test ✓ Success!

Back Next

6. Click on **DASH14512** as the database Schema, click on **CREDIT\_RISK\_TRAIN\_DATA** as the database Table, then click on **Next**.

Dashboard / Configure

credit-risk-deploy

Payload logging ✓

Model details ✓

Quality

Fairness

Explainability

Drift

Select your training table

Select the schema and table from the database. The data in the table should be in the format favorable by the scoring end point.

Schema: DASH14512

Table: CREDIT\_RISK\_TRAIN\_DATA

Back Next

7. Watson OpenScale has determined that **Risk** is the label (target) column. Click **Next**.

Dashboard / Configure

credit-risk-deploy

Payload logging

Model details

Quality

Fairness

Explainability

Drift

Select the label column from the training data

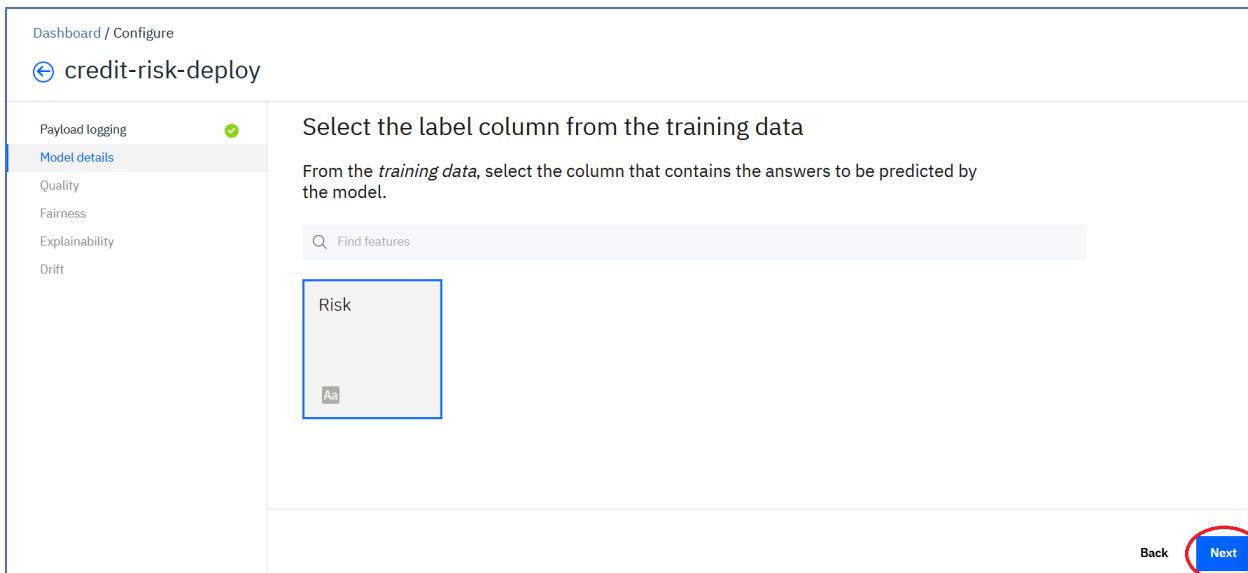
From the *training data*, select the column that contains the answers to be predicted by the model.

Find features

Risk

Aa

Back Next



8. All of the features were used to train the model. Click **Next**.

Dashboard / Configure

credit-risk-deploy

Payload logging

Model details

Quality

Fairness

Explainability

Drift

Select the features used to train the AI deployment

Select the features used to train the model. Providing values for these features allows the AI deployment to generate a prediction.

Select all | Deselect all

Find features

Age

01

CheckingStatus

Aa

CreditHistory

Aa

CurrentResidenceDuration

01

Dependents

01

Employment

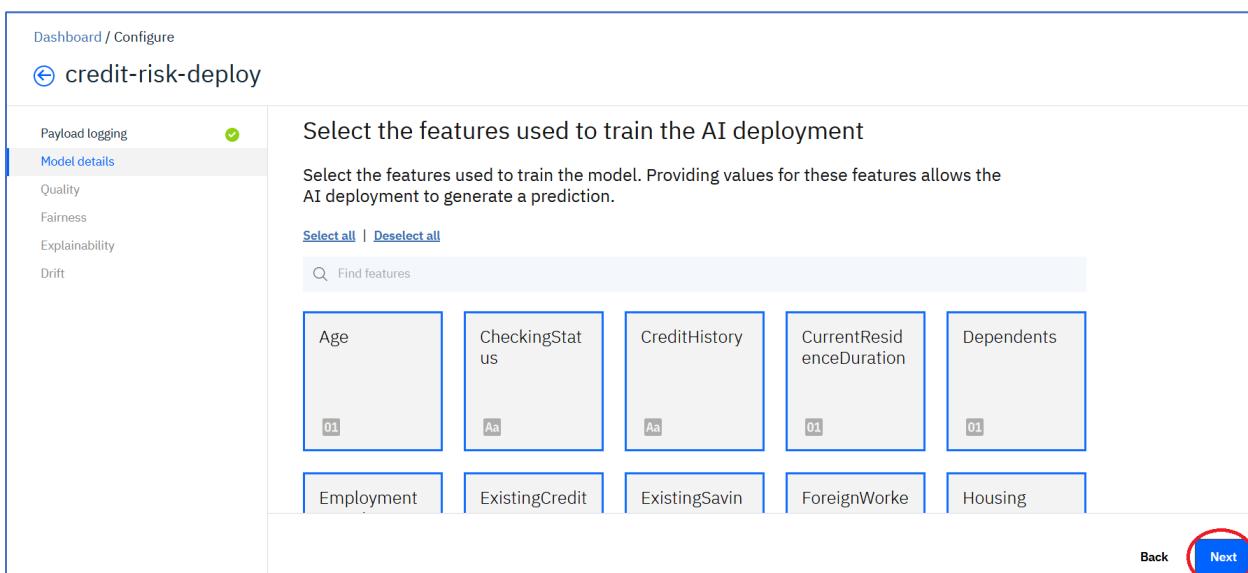
ExistingCredit

ExistingSavin

ForeignWorker

Housing

Back Next



9. Watson OpenScale has determined the text and categorical features. Click **Next**.

Dashboard / Configure

## credit-risk-deploy

Payload logging

Model details

- Quality
- Fairness
- Explainability
- Drift

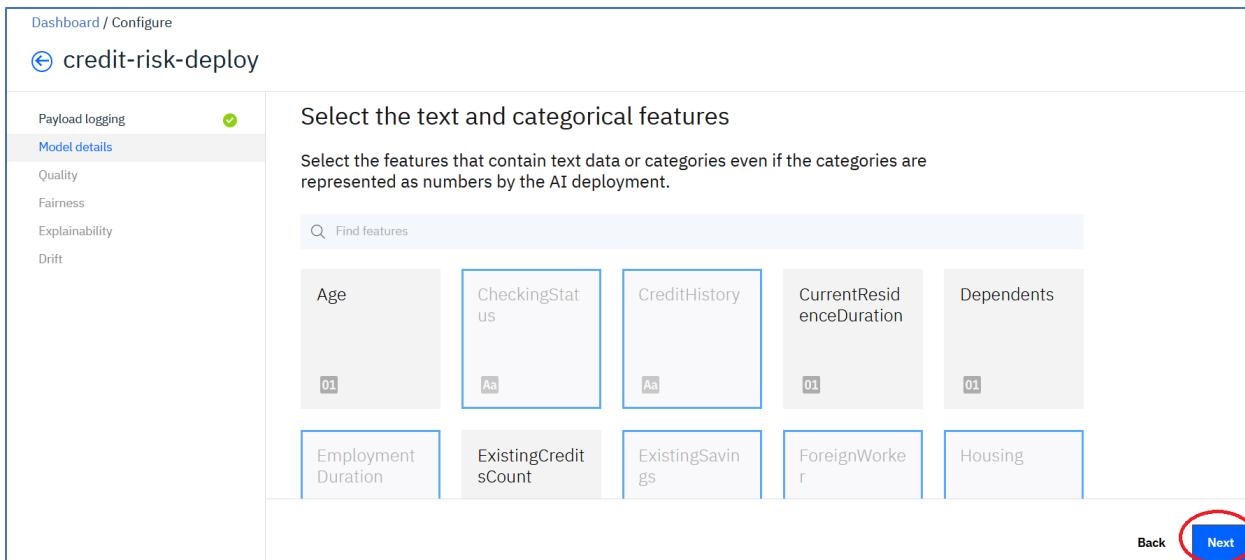
Select the text and categorical features

Select the features that contain text data or categories even if the categories are represented as numbers by the AI deployment.

Q Find features

Age	CheckingStatus	CreditHistory	CurrentResidenceDuration	Dependents
01	Aa	Aa	01	01
EmploymentDuration	ExistingCreditSCount	ExistingSavings	ForeignWorker	Housing

Back **Next**



10. Watson OpenScale has determined the feature that contains the prediction generated by the AI deployment. Click **Next**.

Dashboard / Configure

## credit-risk-deploy

Payload logging

Model details

- Quality
- Fairness
- Explainability
- Drift

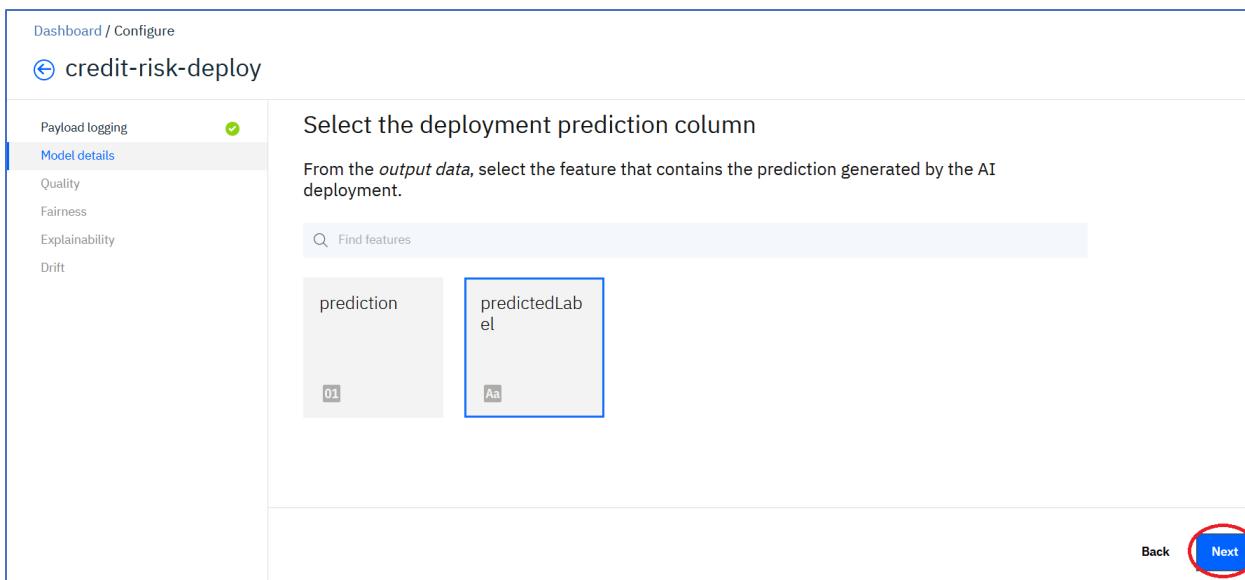
Select the deployment prediction column

From the *output data*, select the feature that contains the prediction generated by the AI deployment.

Q Find features

prediction	predictedLabel
01	Aa

Back **Next**



11. Click **Next**.

Dashboard / Configure

credit-risk-deploy

<input checked="" type="checkbox"/> Payload logging <input checked="" type="checkbox"/> Model details <input type="checkbox"/> Quality <input type="checkbox"/> Fairness <input type="checkbox"/> Explainability <input type="checkbox"/> Drift	<p>Select the transaction ID column (optional)</p> <p>A transaction ID is a unique identifier for each model transaction and associated business event, for example, an order id number. KPI monitoring requires use of transaction IDs to find correlations between model transactions and business events. Transaction IDs are only required for the models you intended to include in KPI monitoring.</p> <p>Find features</p> <p>CheckingStatus CreditHistory LoanPurpose ExistingSavings Employment Duration</p> <p><a href="#">Back</a> <a href="#">Next</a></p>
--	--

12. The Model details summary is displayed. You have the option to edit the parameters.  
Click **Save**.

Dashboard / Configure

credit-risk-deploy

<input checked="" type="checkbox"/> Payload logging <input checked="" type="checkbox"/> Model details <input type="checkbox"/> Quality <input type="checkbox"/> Fairness <input type="checkbox"/> Explainability <input type="checkbox"/> Drift	<p><b>Model details summary</b></p> <p>That's it! Review the summary and click <b>Save</b> to complete setup.</p> <p><b>Location of training data</b> <a href="#">Edit</a> dashdb-entry-yp-dal09-10.services.dal.bluemix.net</p> <p><b>Training schema</b> <a href="#">Edit</a> DASH14512</p> <p><b>Training table</b> <a href="#">Edit</a> CREDIT_RISK_TRAIN_DATA</p> <p><b>Label column</b> <a href="#">Edit</a> Risk</p> <p><b>Features used to train the AI deployment</b> <a href="#">Edit</a></p> <p><a href="#">Back</a> <a href="#">Save</a></p>
--	--

## Configure Quality

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

1. Click on **Quality** to configure the Quality monitor.

Dashboard / Configure

## credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	
Explainability	✓
Drift	

**Model details**

The model is prepared for monitoring.

**Location of training data**  
dashdb-entry-yp-dal09-10.services.dal.bluemix.net

**Training schema**  
DASH14512

**Training table**  
CREDIT\_RISK\_TRAIN\_DATA

**Label column**  
Risk

**Features used to train the AI deployment**

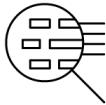
**Edit**

2. Click on **Begin**.

Dashboard / Configure

## credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	
Explainability	✓
Drift	



**What is the Quality monitor?**

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 metric uses a standard data science statistics (for example, F1 score) based on model type. [Learn more](#).

**Begin**

3. Set the quality alert threshold. 90% is chosen below. Click **Next**.

Dashboard / Configure

credit-risk-deploy

Payload logging	✓	Set quality alert threshold
Model details	✓	For classification models, Watson OpenScale will track when the quality of the model falls below an acceptable level. It will check the F1 score which measures the balance between the precision and the recall. This measure takes both false positive and false negatives into account.
<b>Quality</b>		Indicate when quality falls below this threshold
Fairness	✓	
Explainability	✓	
Drift	✓	

1% ————— 100% 90% Good

Back **Next**

4. Set minimum and maximum values for the sample size to be analyzed for quality. 100 is chosen for the minimum sample size, and 10000 is chosen for the maximum. Click **Next**.

Dashboard / Configure

credit-risk-deploy

Payload logging	✓	Set minimum and maximum sample size
Model details	✓	Ensure that your sample size is large enough to be representative of the requests the deployment receives. Set the maximum sample size to limit the volume of data analyzed.
<b>Quality</b>		Minimum sample size required before evaluation ⓘ
Fairness	✓	10 ————— 2,000 <b>100</b>
Explainability	✓	Note: For amounts higher than 2,000, enter the value into the field.
Drift	✓	Maximum sample size to evaluate ⓘ
		10 ————— 50,000 <b>10000</b>
		Note: For amounts higher than 50,000, enter the value into the field.

Back **Next**

5. The Quality summary is displayed. You have the option of editing the parameters. Click **Save**.

Dashboard / Configure

## credit-risk-deploy

Payload logging	✓
Model details	✓
<b>Quality</b>	
Fairness	
Explainability	✓
Drift	

**Quality summary**  
You've finished configuring the Quality monitor!  
Click **Save** to activate this monitor and view the feedback endpoint information.

**Quality threshold** [Edit](#)  
90% (Good)

**Minimum sample size** [Edit](#)  
100

**Maximum sample size** [Edit](#)  
10,000

[Back](#) [Save](#)

## Configure Fairness

The Fairness monitor checks your deployment for biases. It tracks when the model shows a propensity to provide a particular outcome more often for one group over another.

1. Click on **Fairness** to configure the Fairness monitor.

Dashboard / Configure

## credit-risk-deploy

Payload logging	✓
Model details	✓
<b>Quality</b>	✓
<b>Fairness</b>	
Explainability	✓
Drift	

**Quality**  
The Quality monitor is configured.

[Overview](#) [Feedback](#)

**Quality threshold**  
90% (Good)

**Minimum sample size**  
100

**Maximum sample size**  
10,000

[Edit](#)

2. Click **Begin**.

Dashboard / Configure

## credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	



What is the Fairness monitor?

The Fairness monitor checks your deployments for biases. It tracks when the model shows a propensity to provide a particular outcome more often for one group over another.

**Begin**

- Click on **No Risk** and drag to the **Favorable values** and drop where it says **Drag values here**.

Dashboard / Configure

## credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	

Watson OpenScale will calculate the percentage of records that receive the predictions specified.  
If a value is not available in the value list, enter it manually.

Values from training data

No Risk      Risk

Favorable values

Enter a value  Add

Drag values here

Unfavorable values

Enter a value  Add

Back **Next**

- Similarly click on **Risk** and drag to the **Unfavorable values** and drop where it says **Drag values here**. Click **Next**.

Dashboard / Configure

## credit-risk-deploy

	Values from training data	Favorable values
Payload logging	✓	<input type="text"/> Enter a value <button>Add</button>
Model details	✓	No Risk <span>x</span>
Quality	✓	
Fairness		
Explainability	✓	
Drift		

	Unfavorable values
Payload logging	✓
Model details	✓
Quality	✓
Fairness	
Explainability	✓
Drift	

Enter a value Add

No Risk x

Risk x

Back Next

5. Select the features to monitor. Watson OpenScale has automatically select **Sex** and **Age**. Click **Next**.

Dashboard / Configure

## credit-risk-deploy

	Select the features to monitor
Payload logging	✓
Model details	✓
Quality	✓
Fairness	
Explainability	✓
Drift	

For each feature you select, Watson OpenScale will monitor the deployed model's propensity for a favorable outcome for one over the other.

Features are monitored individually, but any debiasing will correct issues for all features together.

**Watson OpenScale Recommends**  
Based on your training data, Watson OpenScale recommends features to monitor for fairness. Select or deselect features by clicking the tiles.

Find features

With the Lite plan, you can select up to 2 features to monitor. Need more? [View upgrade options.](#)

CheckingStat IIS LoanDuration CreditHistory LoanPurpose LoanAmount

Back Next

6. Set the values for Sex that represent the Reference group versus the Monitored group. Watson OpenScale automatically selected these values. Click on **Next**.

Dashboard / Configure

## credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	

Specify reference and monitored groups [Sex] ⓘ

Divide values into two groups - reference and monitored. Reference group values are used to calculate disparities of outcomes between groups. Specify the monitored group values that will be compared with the reference group to check for potential bias.

Watson OpenScale Recommends Based on your training data, recommended reference and monitored groups have been preselected.

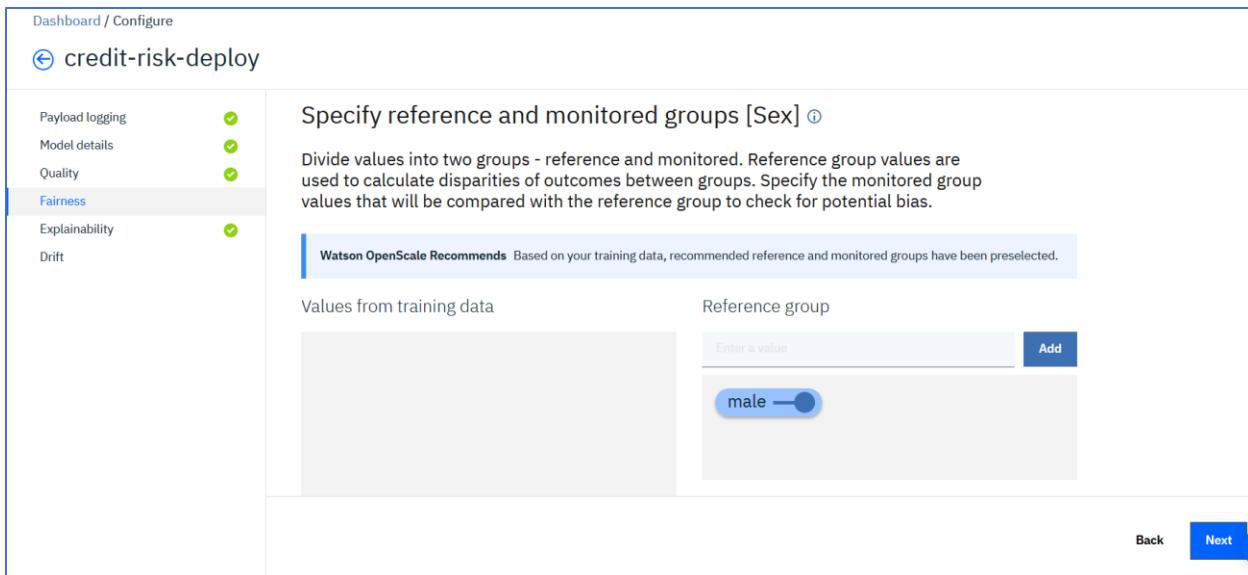
Values from training data

Reference group

Enter a value Add

male

Back Next



7. Set the fairness alert threshold value for Sex. Use a value of 95% (the screenshot says 80%, but use 95%). Click **Next**.

Dashboard / Configure

## credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	

Set fairness alert threshold [Sex]

Track when fairness falls below an acceptable level.

Watson OpenScale Recommends Based on your training data, the fairness percentage has been set to 80.

Indicate when fairness falls below this threshold

1% ————— 100% 80% Fair

Back Next



8. Set the values for Age that represent the Reference group versus the Monitored group. Note that Watson OpenScale automatically selects a range of values. We will change the default values. Click on the filled circle in the Reference group, enter **19** as the **Starting value**, enter **25** as the **End value**, and click on **Add**.

### Reference group

Starting value      End value

19      25

Add

19-43 —

### Monitored group

Starting value      End value

0      1

Add

44-67 —

9. Click on the filled circle in the **Monitored group**, enter **26** for the **Starting value**, enter **75** for the **End value**, and click on **Add**.

### Reference group

Starting value      End value

19	25	Add
----	----	-----

19-25 x    19-43 —

### Monitored group

Starting value      End value

26	74	Add
----	----	-----

44-67 —

10. Click **Next**.

Starting value      End value

▼

▼
Add

19-25 x
19-43

Monitored group

Starting value      End value

▼

▼
Add

26-74 x
44-67

Back
Next

11. Set the fairness alert threshold for Age. Select **95%**. Click **Next**.

Dashboard / Configure

⊕ credit-risk-deploy

<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;">Payload logging</div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;">Model details</div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;">Quality</div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px; background-color: #e0f2e0;">Fairness</div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;">Explainability</div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;">Drift</div>	<p>Set fairness alert threshold [Age]</p> <p>Track when fairness falls below an acceptable level.</p> <div style="background-color: #e0f2e0; padding: 5px; margin-top: 10px;"> <b>Watson OpenScale Recommends</b> Based on your training data, the fairness percentage has been set to 80.         </div> <p>Indicate when fairness falls below this threshold</p> <div style="text-align: center; margin-top: 10px;"> <div style="width: 400px; position: relative;"> <span style="position: absolute; left: -10px; top: 0; writing-mode: vertical-rl; transform: rotate(180deg);">1%</span> <span style="position: absolute; left: 50%; top: 0; writing-mode: vertical-rl; transform: rotate(180deg);">100%</span> <span style="position: absolute; right: -10px; top: 0; writing-mode: vertical-rl; transform: rotate(180deg);">95% Fair</span> <div style="width: 100%; height: 2px; background-color: #ccc; position: absolute; left: 0; top: 50%;"></div> <span style="position: absolute; left: 50%; top: 50%; width: 0; height: 0; border-left: 10px solid transparent; border-right: 10px solid transparent; border-top: 20px solid #005a9c; position: absolute; z-index: 1; margin-left: -10px; margin-top: -20px;"></span> </div> </div>
--	---

Back
Next

12. Set the minimum sample size to compute fairness. Select **200**. Click **Next**.

Dashboard / Configure

### credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	

**Set minimum sample size**

Ensure that your sample size is large enough to be representative of the requests the deployment receives. A small sample size may skew results.

Minimum sample size required before evaluation

10  2,000 **200**

Note: For amounts higher than 2,000, enter the value into the field.

[Back](#) 

13. The Fairness Monitor summary is displayed. You have the option to Edit the parameters. Click **Save**.

Dashboard / Configure

### credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	

**Fairness summary**

You've finished configuring the Fairness monitor! Click **Save** to activate this monitor and view the debiased scoring endpoint information.

**Favorable outcomes** [Edit](#)  
No Risk

**Unfavorable outcomes** [Edit](#)  
Risk

**Sex** [Edit](#)

Reference group	male
Monitored group	female
Fairness threshold	95%

**Age** [Edit](#)

[Back](#) 

## Configure Drift

The Drift monitor measures two types of changes. It measures the drop in accuracy of the deployed model during runtime. The model accuracy could drop if there is an increase in the number of transactions similar to ones that the model was not able to accurately evaluate in the training data.

It measures the drop in consistency of the data in runtime as compared to the characteristics of the data at training.

1. Click on **Drift** to configure the Drift monitor.

Dashboard / Configure

credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	✓

**Fairness**  
The Fairness monitor is configured.

**Overview**   **Debias Endpoint**

**Favorable outcomes**  
No Risk

**Unfavorable outcomes**  
Risk

**Sex**

Reference group	male
Monitored group	female
Fairness threshold	95%

**Edit**

2. Click **Begin**.

Dashboard / Configure

credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	✓



**What is the Drift monitor?**

The drift monitor measures two types of changes.

**Drop in accuracy** (structured binary and multi-class classification models only)  
It estimates the drop in accuracy of the model at runtime. The model accuracy could drop if there is an increase in transactions similar to those which the model was unable to evaluate correctly in the training data.

**Drop in data consistency**  
It estimates the drop in consistency of the data at runtime as compared to the characteristics of the data at training time.

**Begin**

3. Watson OpenScale will detect a drop in accuracy using a custom drift model generated from the training data. Similarly, it detects a drop in data consistency by analyzing your training data. Click on **Analyze and train in Watson OpenScale**. Click **Next**.

Dashboard / Configure

credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	

**Configure accuracy drift monitor**

Watson OpenScale will detect a drop in accuracy using a custom drift model generated from your training data. Similarly, it detects a drop in data consistency by analyzing your training data. Watson OpenScale can analyze the data and train the model for you or you can do it yourself using a custom notebook. ⓘ

**Analyze and train in Watson OpenScale**

Select this option when:

- A connection to the training data was specified in the Model details section and...
- Size of training data is less than 500MB.

**Analyze and train in a notebook**

Select this option when:

- A training data distribution was uploaded in the Model details section or...
- A connection to the training data was specified in the Model details section but the size of the training data exceeds 500MB

Back **Next**

4. Set the drift alert threshold. Select **10%**. Click **Next**.

Dashboard / Configure

credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	

**Set drift alert threshold**

Watson OpenScale will track the degree of change in model accuracy when compared to the accuracy at training time.

Indicate the magnitude of change to tolerate.

5% **10%** 99%

Testing the model on a sample of the training data set determines the baseline for measuring change. The drift measure will be reported as an estimated value with a specified margin of error. The drift threshold must be 5% or greater.

Back **Next**

5. Set the sample size to compute Drift. Select **200**. Click **Next**.

Dashboard / Configure

### credit-risk-deploy

Payload logging	<input checked="" type="checkbox"/>
Model details	<input checked="" type="checkbox"/>
Quality	<input checked="" type="checkbox"/>
Fairness	<input checked="" type="checkbox"/>
Explainability	<input checked="" type="checkbox"/>
Drift	<input checked="" type="checkbox"/>

**Set sample size**

Ensure that your sample size is large enough to be representative of the requests the deployment receives.

Number of records to evaluate (sliding window) [?](#)

1  50,000 **200**

Note: For amounts higher than 50,000, enter the value into the field.

Records are evaluated every three hours. If the number of new records received within three hours exceeds the sample size, the additional records are evaluated as well. If the number of new records received within three hours falls below the sample size, additional records from previous hours are added to meet the required sample size.

[Back](#) **Next**

- The Drift monitor summary is displayed. You have the option of editing the parameters. Click **Save**.

Dashboard / Configure

### credit-risk-deploy

Payload logging	<input checked="" type="checkbox"/>
Model details	<input checked="" type="checkbox"/>
Quality	<input checked="" type="checkbox"/>
Fairness	<input checked="" type="checkbox"/>
Explainability	<input checked="" type="checkbox"/>
Drift	<input checked="" type="checkbox"/>

**Drift**

The Drift monitor is configured.

Drift alert threshold [Edit](#)  
10%

Sample size [Edit](#)  
200

[Back](#) **Save**

## Submit Feedback and View Quality Metrics

In order to measure quality, scored transactions including human labeled feedback must be provided.

- Click on the  to display the **Insights Dashboard**.

IBM Watson OpenScale

Dashboard / Configure

credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	✓

2. Click on **Model Monitors**.

Insights Dashboard

Application Monitors <small>beta</small>	0	Model Monitors	1
--	---	----------------	---

3. Click on vertical ellipse .

# Insights Dashboard

Application Monitors <small>beta</small>	Model Monitors
0	1

Deployments Monitored	Quality Alerts	Fairness Alerts	Drift Alerts
1	0	0	0

 Quality and Fairness metrics update every hour. Drift metrics update every 3 hours.

Watson Machine Learning

credit-risk-deploy 

Issues

0

Quality      Fairness      Drift

N/A      N/A      N/A

---

Evaluation pending

4. Click on **Configure Monitors**.

# Insights Dashboard

Application Monitors *beta*

0

Model Monitors

1

Deployments  
Monitored

1

Quality  
Alerts

0

Fairness  
Alerts

0

Drift  
Alerts

0

*i* Quality and Fairness metrics update every hour. Drift metrics update every 3 hours.

Watson Machine Learning

**credit-risk-deploy**

⋮

Issues

0

[View details](#)

[Configure monitors](#)

[Remove deployment](#)

Quality

N/A

N/A

N/A

Evaluation pending

5. Click on **Quality** and then click on **Feedback**.

Dashboard / Configure

## credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	✓

**Quality**

The Quality monitor is configured.

Overview Feedback

**Quality threshold**  
90% (Good)

**Minimum sample size**  
100

**Maximum sample size**  
10,000

6. Click on **Add Feedback**.

Dashboard / Configure

## credit-risk-deploy

Payload logging	✓
Model details	✓
Quality	✓
Fairness	✓
Explainability	✓
Drift	✓

**Quality**

The Quality monitor is configured.

Overview Feedback

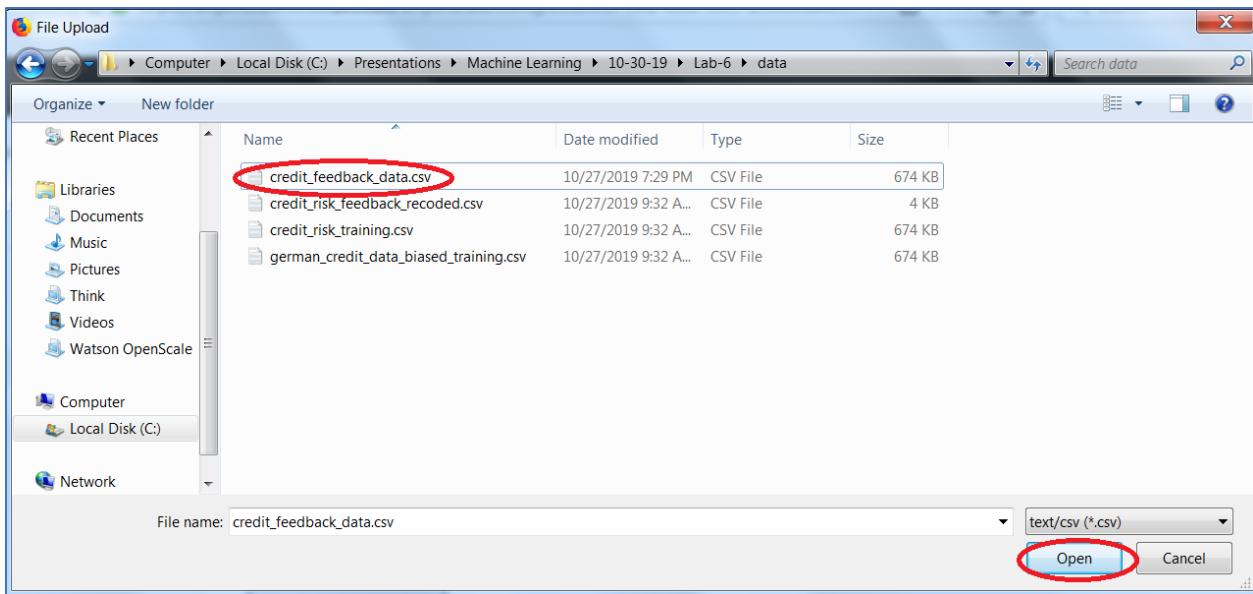
Watson OpenScale provides an endpoint for sending fresh test data for ongoing quality evaluation. You can upload feedback data here or work with your developer to integrate the code snippet provided to publish feedback data to your Watson OpenScale database.

Add Feedback Data

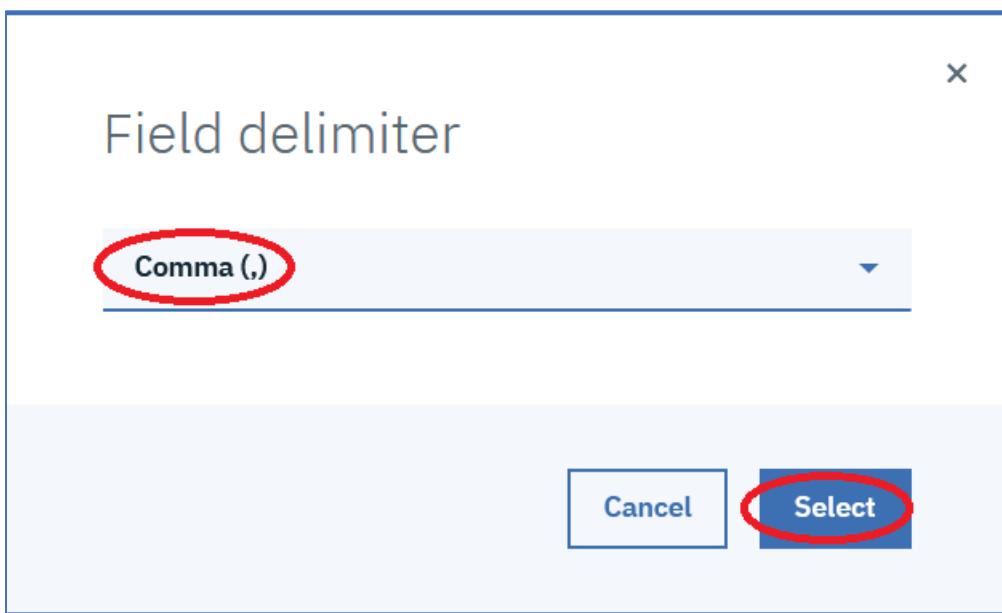
**Details**

Deployment name	credit-risk-deploy
Datamart ID	52876bf1-a1bc-4e53-af1a-4dbf3dd7baf1

7. Navigate to the feedback file **credit\_feedback\_data.csv**. Click on **Open**.



8. Select **Comma** as the **Delimiter**. Click **Select**.



9. After the file is successfully uploaded, click on the icon.

Dashboard / Configure

credit-risk-deploy

Payload logging ✓

Model details ✓

**Quality** ✓

Fairness ✓

Explainability ✓

Drift ✓

**Quality**

The Quality monitor is configured.

Watson OpenScale provides an endpoint for sending fresh test data for ongoing quality evaluation. You can upload feedback data here or work with your developer to integrate the code snippet provided to publish feedback data to your Watson OpenScale database.

✓ credit\_feedback\_data.csv uploaded successfully OK

Overview Feedback

Deployment name: credit-risk-deploy

Data mart ID: 52876bf1-a1bc-4e53-af1a-4dbf3dd7ba1

Feedback table name: Feedback 7b34ccbd-c231-42f1-ad9d-d32a72f39605

View API Specification | Download

Edit

10. Click on **Monitor Models**.

# Insights Dashboard

Application Monitors beta 0

Model Monitors 1

11. Click on the icon to evaluate the quality.

## Insights Dashboard

Application Monitors *beta*  
0

Model Monitors  
1

Deployments  
Monitored

1

Quality  
Alerts

0

Fairness  
Alerts

0

Drift  
Alerts

0

 Quality and Fairness metrics update every hour. Drift metrics update every 3 hours.

Watson Machine Learning

**credit-risk-deploy**



Issues

0

Quality

N/A

Fairness

N/A

Drift

N/A

Evaluation pending

12. Click on **View details**.

# Insights Dashboard

Application Monitors *beta*

0

Model Monitors

1

Deployments

Monitored

1

Quality

Alerts

0

Fairness

Alerts

0

Drift

Alerts

0

*i* Quality and Fairness metrics update every hour. Drift metrics update every 3 hours.

Watson Machine Learning

credit-risk-deploy

⋮

Issues

0

View details

Configure monitors

Remove deployment

Quality

N/A

F

N/A

N/A

Evaluation pending

13. Click on Area under ROC and click on Check quality now.

credit-risk-deploy

Model ID: 7865b8b8-5a2d-444a-8df9-34c3240473cf    Created date: 10/27/2019    Configure monitors

Fairness

Sex

Age

Quality

**Area under ROC**

Area

Area under ROC

Accuracy

True positive rate (TPR)

False positive rate (FPR)

Recall

Precision

F1-Measure

Logarithmic loss

Drift

Drop in accuracy

Performance

Area under ROC

Area under recall and false positive rate curve. [Learn more](#).

Time frame

Hourly

Daily

Weekly

Past 3 months

Past week

Yesterday

Today

Custom range

Date range

No data for selected time range

Schedule

Last Evaluation

Not yet evaluated

Next Evaluation

N/A

**Check quality now**

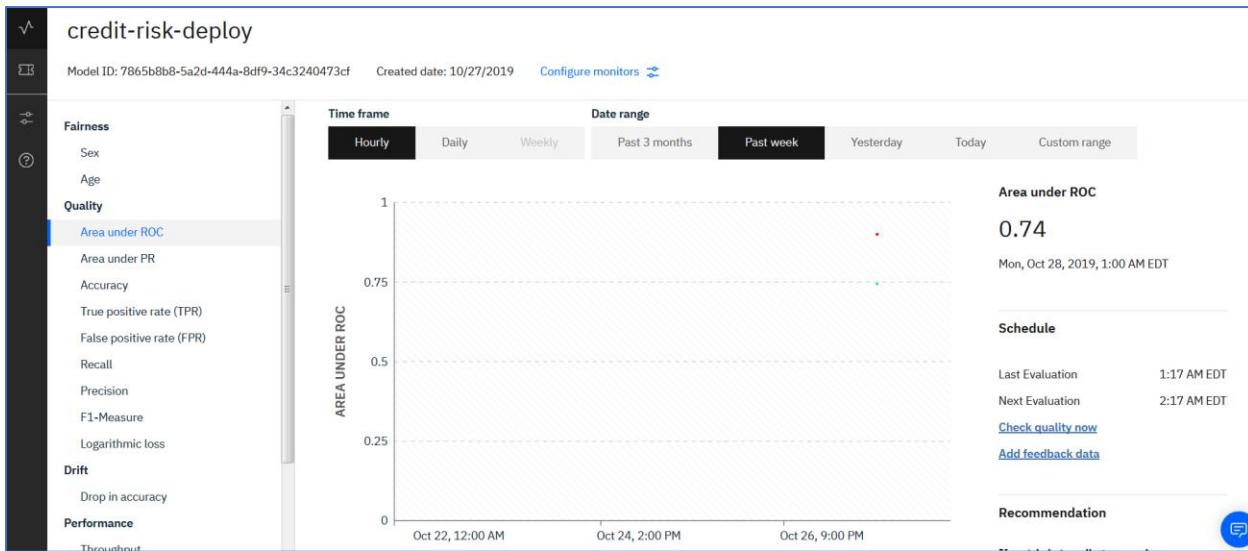
Add feedback data

Recommendation

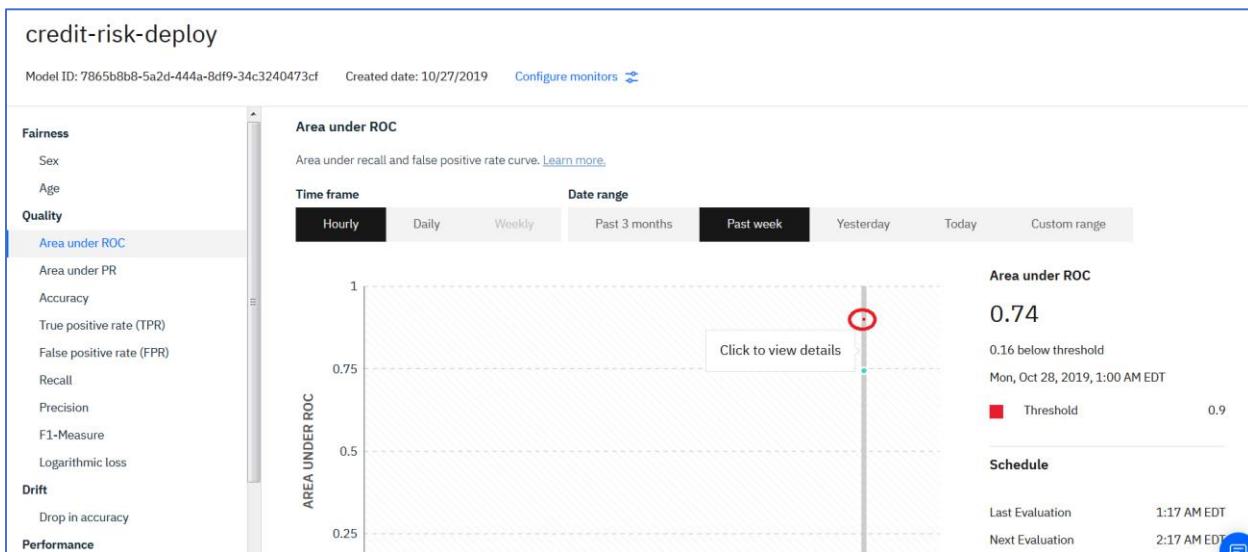
If metric is trending upwards

Metric is improving. Model retraining is effective.

14. The screen is refreshed with the Area under ROC.



15. Click on the “red dot”.



16. The metrics are displayed. Click on the icon.

credit-risk-deploy : Area under ROC

Area under ROC	Area under PR	Accuracy	True positive rate (TPR)	False positive rate (FPR)	Recall	Precision	F1-Measure	Logarithmic loss
0.74	0.69	0.8	0.56	0.08	0.56	0.79	0.66	0.43

Actual	Prediction	No Risk	Risk
No Risk		3077	253
Risk		728	942

**Records Evaluated**

Total	5000
-------	------

17. Click on the icon again.

credit-risk-deploy

Model ID: 7B65b8b8-5a2d-444a-8df9-34c3240473cf    Created date: 10/27/2019    Configure monitors

**Fairness**

- Sex
- Age

**Quality**

- Area under ROC**
- Area under PR
- Accuracy
- True positive rate (TPR)
- False positive rate (FPR)
- Recall
- Precision
- F1-Measure
- Logarithmic loss

**Drift**

- Drop in accuracy

**Performance**

**Area under ROC**

Area under recall and false positive rate curve. [Learn more.](#)

**Time frame**

- Hourly
- Daily
- Weekly
- Past 3 months
- Past week**
- Yesterday
- Today
- Custom range

**Date range**

Area under ROC

0.74

Mon, Oct 28, 2019, 1:00 AM EDT

**Schedule**

Last Evaluation: 1:17 AM ED  
Next Evaluation: 2:17 AM ED

[Check quality now](#) [Add feedback data](#)

18. Click on **Model Monitors**.

# Insights Dashboard

**Application Monitors beta**

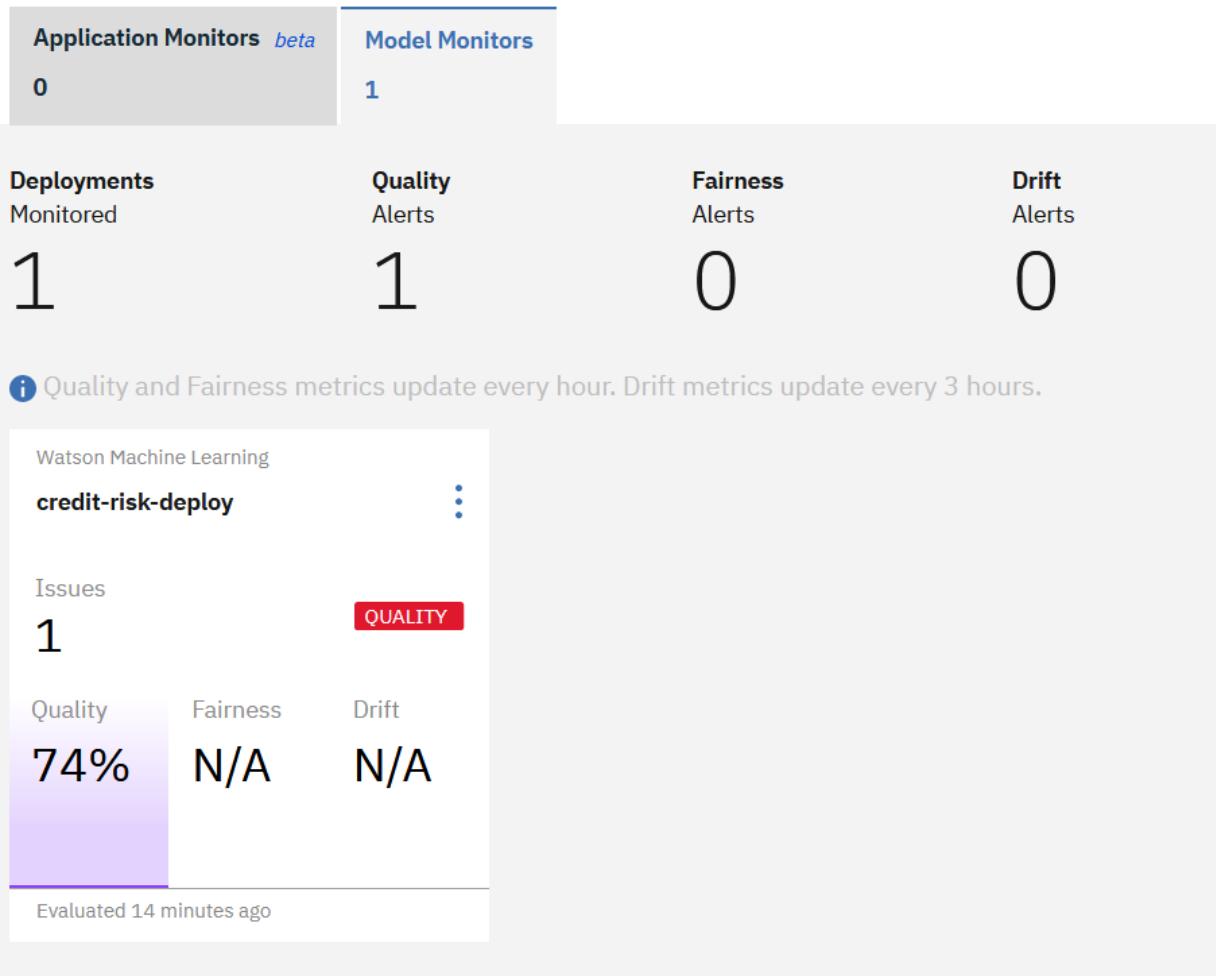
0

**Model Monitors**

1

19. The Insights Dashboard is displayed, showing the quality alert triggered by uploading the feedback data.

# Insights Dashboard



## Score Transactions and View Fairness Metrics

In order to display Fairness metrics, we need to direct transactions to the deployed model. We will use the scoring.json file as sample data that Watson Studio will submit to the deployed model

1. Return to Watson Studio by clicking on the **Watson Studio** browser tab.



2. You should be at the **Test** tab of the **credit-risk-deploy** page.

The screenshot shows the IBM Watson Studio interface. The title bar says "credit-risk-deploy". The tabs at the top are "Overview", "Implementation", and "Test", with "Test" being the active tab. Below the tabs is a section titled "Enter input data" containing a JSON object:

```
{
  "fields": [
    "CheckingStatus",
    "LoanDuration",
    "CreditHistory",
    "LoanPurpose",
    "LoanAmount",
    "ExistingSavings",
    "EmploymentDuration",
    "InstallmentPercent",
    "Sex",
    "OthersOnLoan",
    "CurrentResidenceDuration",
    "OwnsProperty",
    "Age",
    "InstallmentPlans",
    "Housing",
    "ExistingCreditsCount",
    "Job",
    "Dependents",
    "Telephone",
    "ForeignWorker"
  ],
  "values": [
    {
      "radio_tv": "3526",
      "radio_tv_100_to_500": "100_to_500",
      "radio_tv_1_to_4": "1_to_4",
      "radio_tv_male": "male"
    }
  ]
}
```

At the bottom left of this section is a blue "Predict" button.

3. Clear out the contents of the **input data** area.
4. Navigate to where the scoring.json file and cut and paste the contents of the file into the **input data** area.

```
{"fields": ["CheckingStatus", "LoanDuration", "CreditHistory", "LoanPurpose", "LoanAmount", "ExistingSavings", "EmploymentDuration", "InstallmentPercent", "Sex", "OthersOnLoan", "CurrentResidenceDuration", "OwnsProperty", "Age", "InstallmentPlans", "Housing", "ExistingCreditsCount", "Job", "Dependents", "Telephone", "ForeignWorker"], "values": [{"radio_tv": "3526", "radio_tv_100_to_500": "100_to_500", "radio_tv_1_to_4": "1_to_4", "radio_tv_male": "male"}]}
```

5. Click on **Predict**

The screenshot shows the same "credit-risk-deploy" project in the "Test" tab. The "Enter input data" section contains the same JSON configuration as the previous screenshot. The "Predict" button at the bottom left is circled in red.

6. The result is displayed below.

The screenshot shows the IBM Watson Studio interface. In the center, there's a code editor window titled "credit-risk-deploy" with the tab "Test" selected. The code in the editor is a JSON object with a "fields" key containing a list of feature names. A red box highlights this "fields" section. Below the editor is a "Predict" button. The top navigation bar shows "My Projects / Watson Studio Labs / credit-risk / credit-risk-deploy". The status bar at the bottom right shows the time as 1:53 AM.

```
{"fields": ["CheckingStatus", "LoanDuration", "CreditHistory", "LoanPurpose", "LoanAmount", "ExistingSavings", "EmploymentDuration", "InstallmentPercent", "Sex", "OthersOnLoan", "CurrentResidenceDuration", "OwnsProperty", "Age", "InstallmentPlans", "Housing", "OutstandingCreditCount", "Job", "Dependents", "Telephone", "FormerWorker", "values": [{"greater": 200, "le": 16, "outstanding": "credit", "radio": "tv", "value": 3520}, {"range": "100_to_500", "value": 1, "to": 4, "radio": "a"}, {"radio": "male", "value": 1}], "values": [{"radio": "female", "value": 1}], "radio": "male", "value": 1}
```

7. Click on the **Watson OpenScale** browser tab.

8. Click on the icon.

The screenshot shows the Watson OpenScale Insights Dashboard. At the top, it says "Insights Dashboard". Below that, there are two tabs: "Application Monitors beta" (0) and "Model Monitors" (1). The main area has four metrics: "Deployments Monitored" (1), "Quality Alerts" (1), "Fairness Alerts" (0), and "Drift Alerts" (0). Below these, a note says "Quality and Fairness metrics update every hour. Drift metrics update every 3 hours." A section for "Watson Machine Learning" shows a deployment named "credit-risk-deploy" with a red circle around the three-dot menu icon. It also shows "Issues" (1) and a "QUALITY" status. At the bottom, it says "Evaluated 1 minute ago".

9. Click on **View details**.

## Insights Dashboard

Application Monitors <small>beta</small>	Model Monitors		
0	1		
Deployments Monitored	Quality Alerts	Fairness Alerts	Drift Alerts
1	1	0	0

ⓘ Quality and Fairness metrics update every hour. Drift metrics update every 3 hours.

Watson Machine Learning

credit-risk-deploy

Issues 1

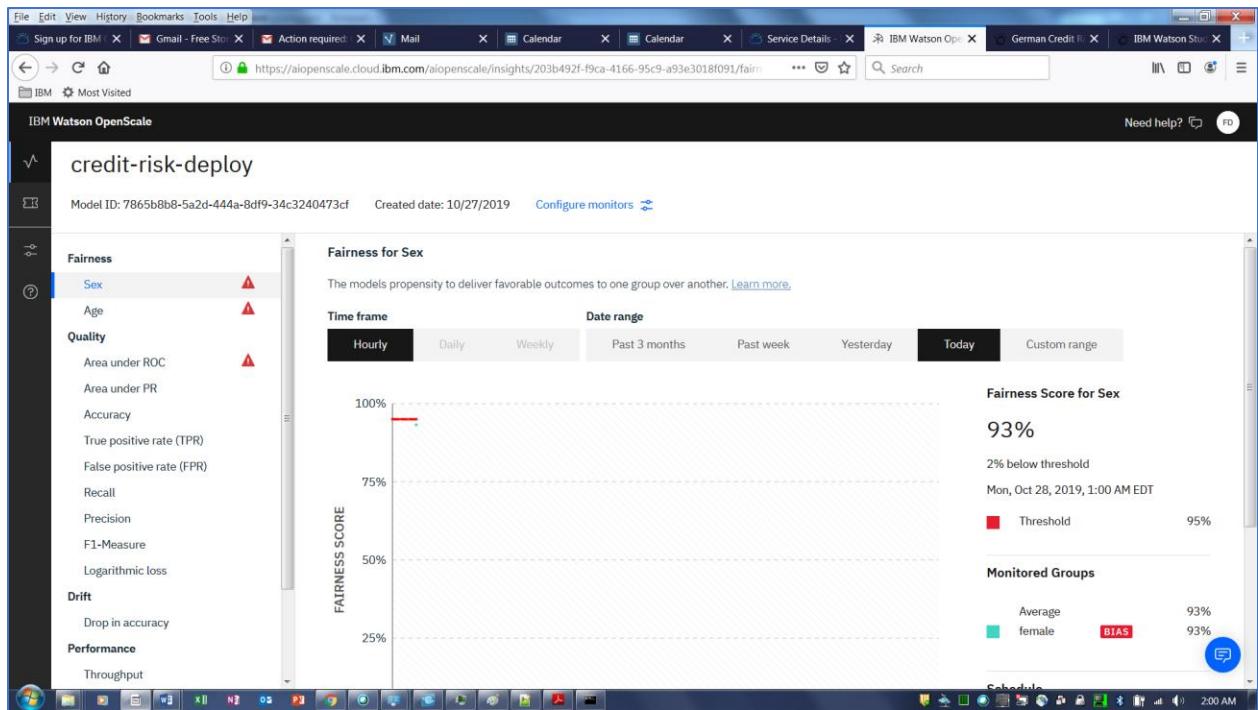
Quality 74%

Fairness N/A

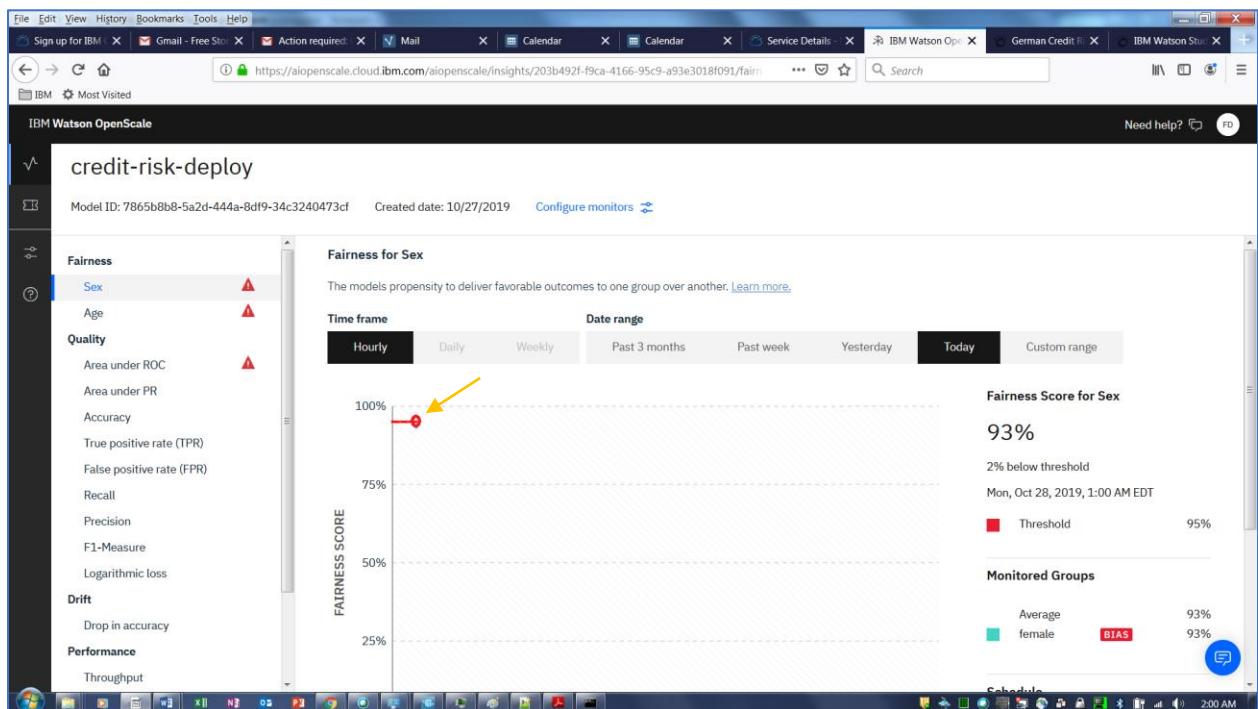
Evaluated 2 minutes ago

- View details
- Configure monitors
- Remove deployment

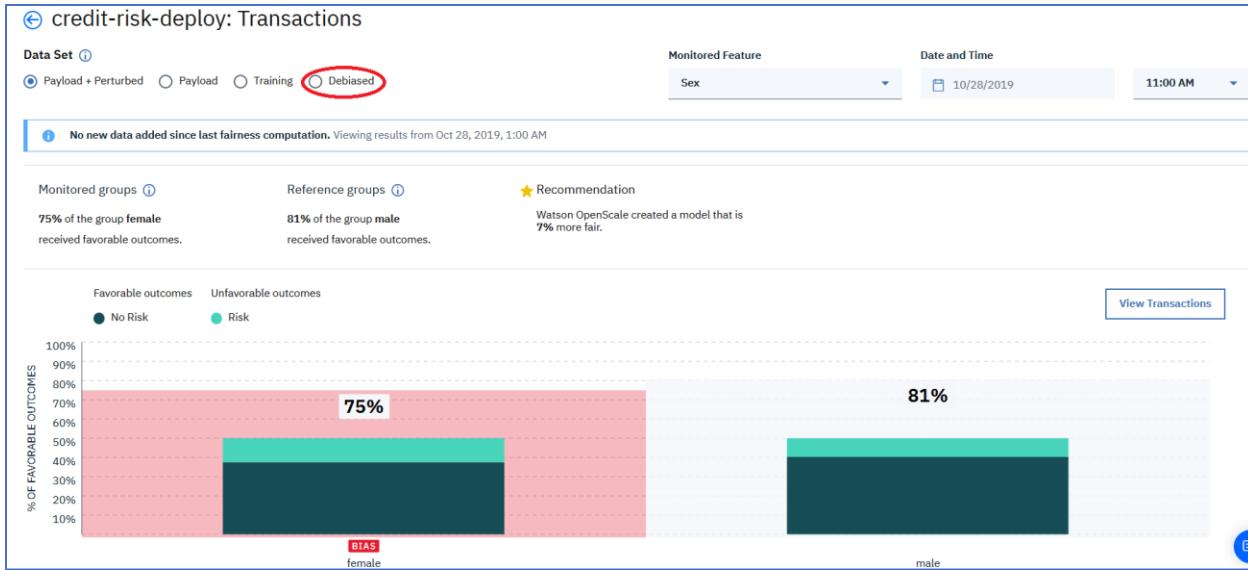
10. The Fairness score for sex is 2% below the threshold and triggers an alert.



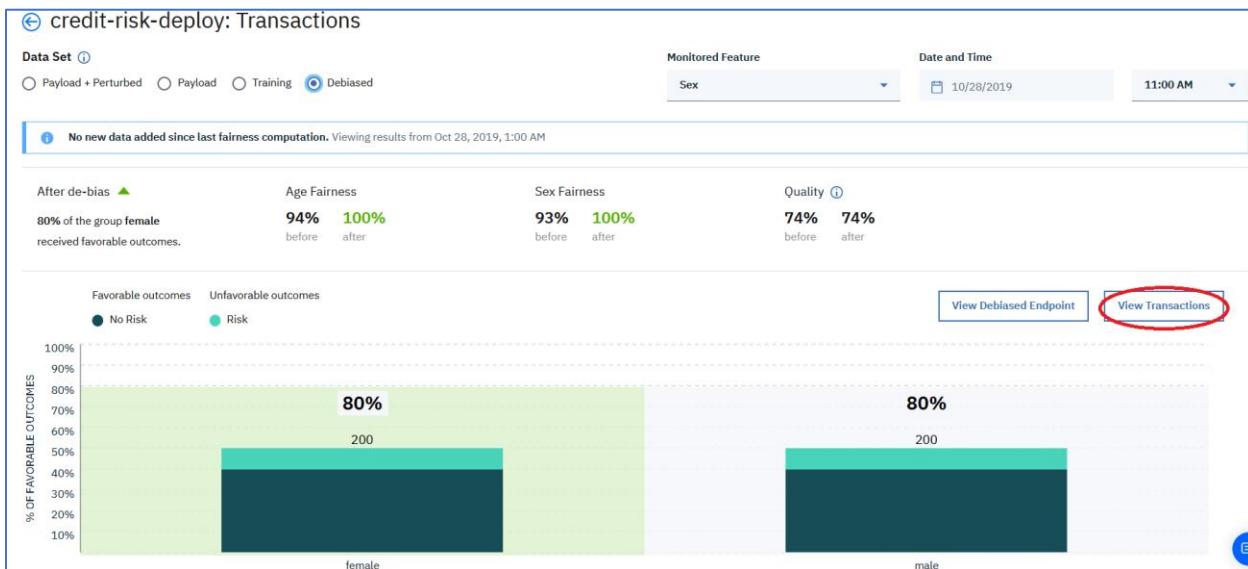
11. Click on the “red dot” to view more details.



12. The discrepancy between Male and Female results are sufficient to trigger a bias alert.  
Click on **Debiased**.



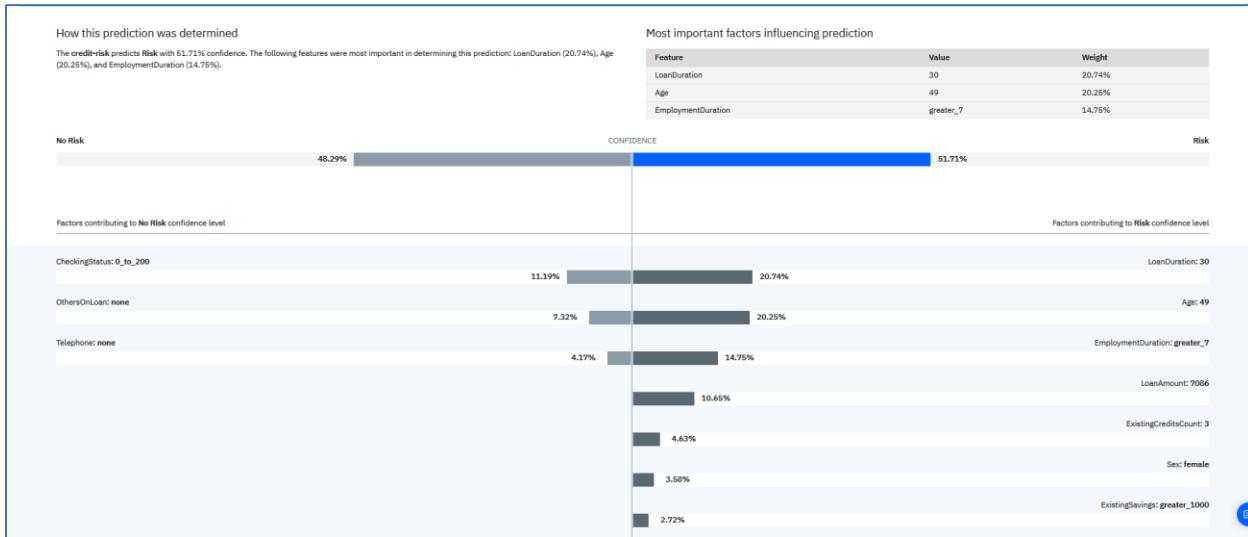
13. The results show that applying a debiasing scheme will reduce the bias to zero. The endpoint for invoking the debiasing algorithm can be obtained by clicking on View Debiased Endpoint. For now, click on **View Transaction** to display a list of transactions.



14. Click **Explain** next to a transaction to get an explanation of the factors that caused the deployed model to make the prediction it did for that transaction. I picked the first transaction that resulted in a Risk prediction.

The screenshot shows the IBM Watson OpenScale interface. On the left, a table lists transactions with columns for Transaction ID, Sex, Bias Detected, Outcome, and Action. One row's 'Action' column contains a blue 'Explain' link, which is circled in red. On the right, two horizontal bar charts compare 'Current Model' and 'De-biased Model' across two categories: 'No Risk : Favorable Outcome' and 'Risk : Unfavorable Outcome'. The 'No Risk' chart shows 75.00% for Current Model and 79.50% for De-biased Model. The 'Risk' chart shows 25.00% for Current Model and 20.50% for De-biased Model.

15. The results show two ways of explaining the prediction. One is using a LIME approach that provides factors “for” and “against” the decision. The second method is called **Contrastive Explanation**. It provides the minimum changes in features that would result in a different decision. It also provides the maximum changes in features that would leave the result the same.



**Congratulations! You have completed the Lab!!!**

- ✓ Imported a machine learning model
- ✓ Deployed the model
- ✓ Provisioned Watson OpenScale
- ✓ Configured the payload logging database and Machine Learning provider
- ✓ Scored Data
- ✓ Prepared the Deployed Model for Monitoring
- ✓ Configured Payload Logging
- ✓ Configured Quality Monitoring
- ✓ Configured Fairness Monitoring
- ✓ Configured Drift Monitoring
- ✓ Submitted Feedback and Viewed Quality Metrics
- ✓ Scored Data and Viewed Fairness Metrics
- ✓ Explained a Transaction.