

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.

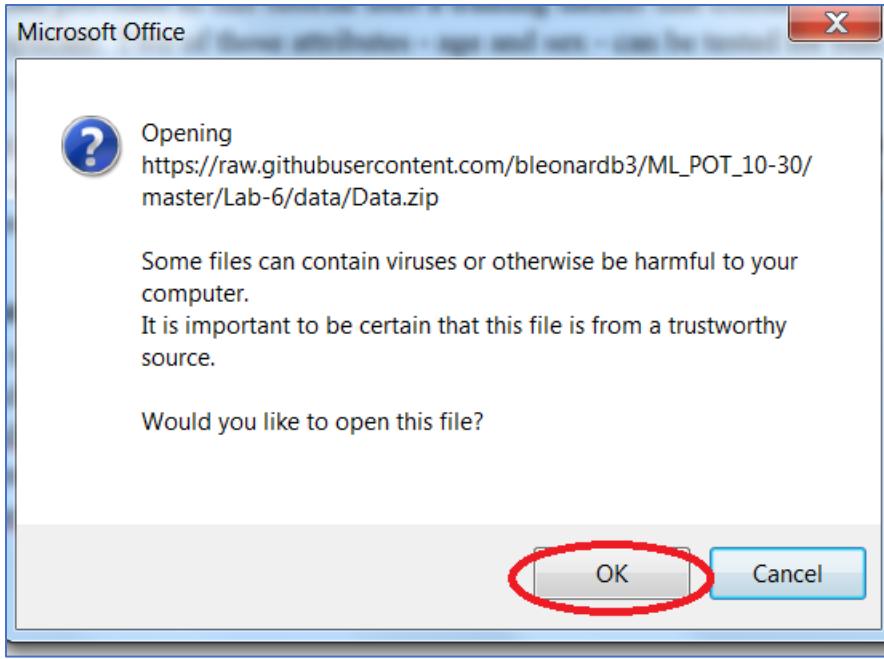
The data science techniques most suited to these diverse datasets, such as gradient boosted trees and neural networks, can generate highly accurate risk models, but at a cost. Such "black box" models generate opaque predictions that must somehow become transparent, to ensure regulatory approval such 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.

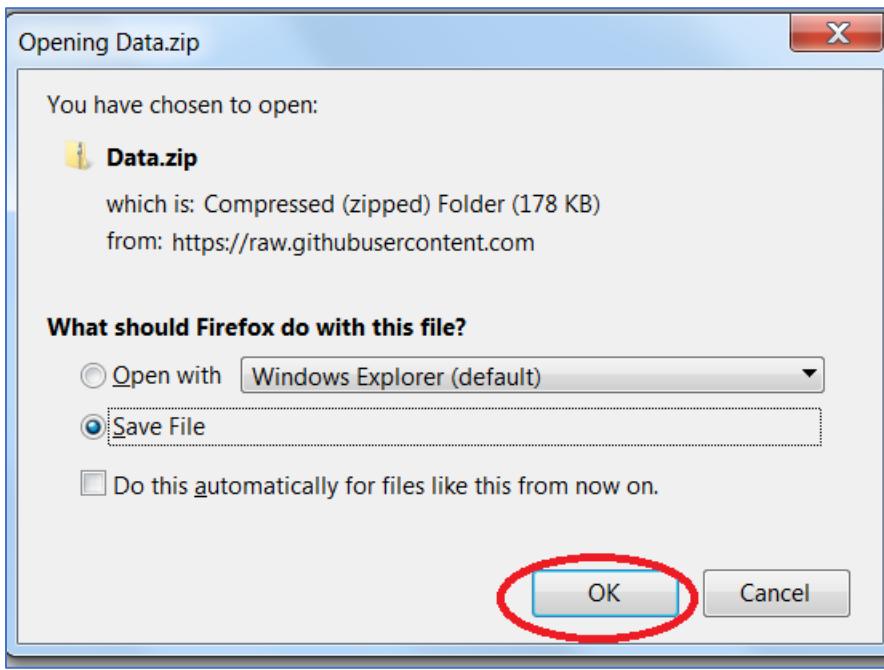
Watson OpenScale will monitor the deployed model's propensity for a favorable outcome ("No Risk") for one group (the Reference Group) over another (the Monitored Group). In this tutorial, the Monitored Group for sex is `female`, while the Monitored Group for age is `19 to 25`.

Download the Lab Files

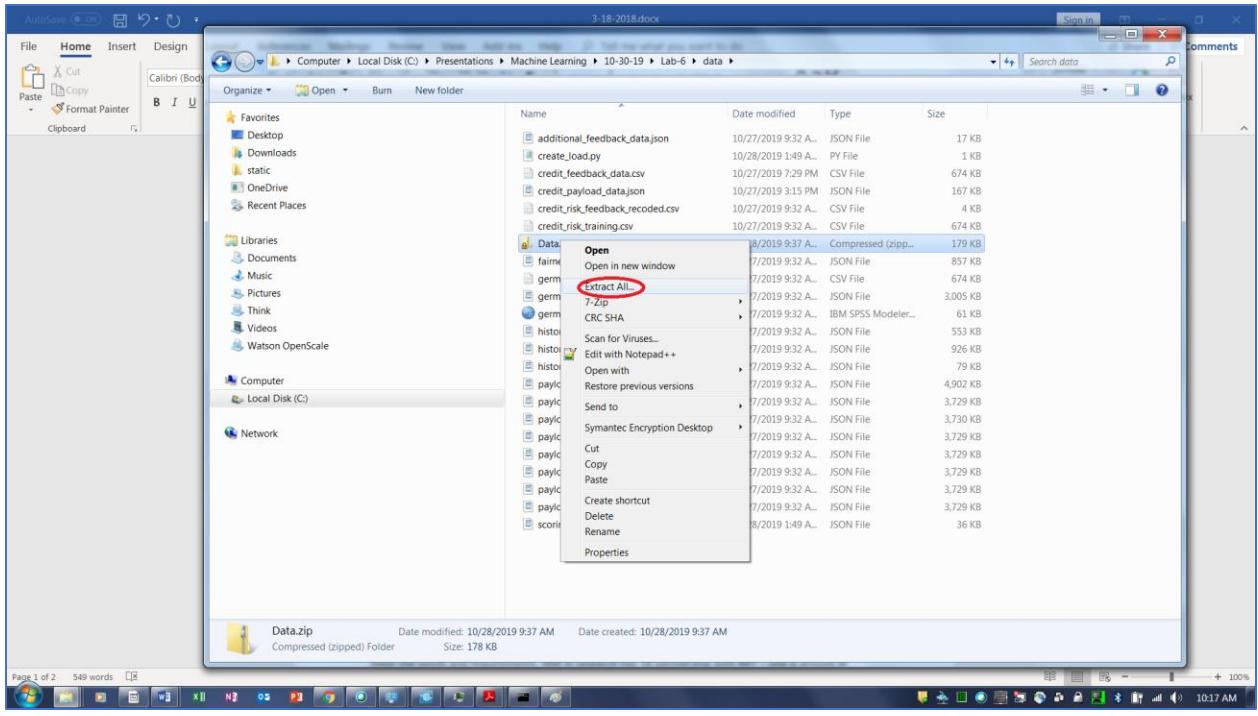
1. Click [here](#) to download the Data.zip file.
 1. `credit_feedback_data.csv`
 2. `credit_payload_data.json`
 3. `german_credit_data_biased_training.csv`
 4. `scoring.json`
2. Click **OK**. Note your browser may not prompt this message.



3. Click **OK**.



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

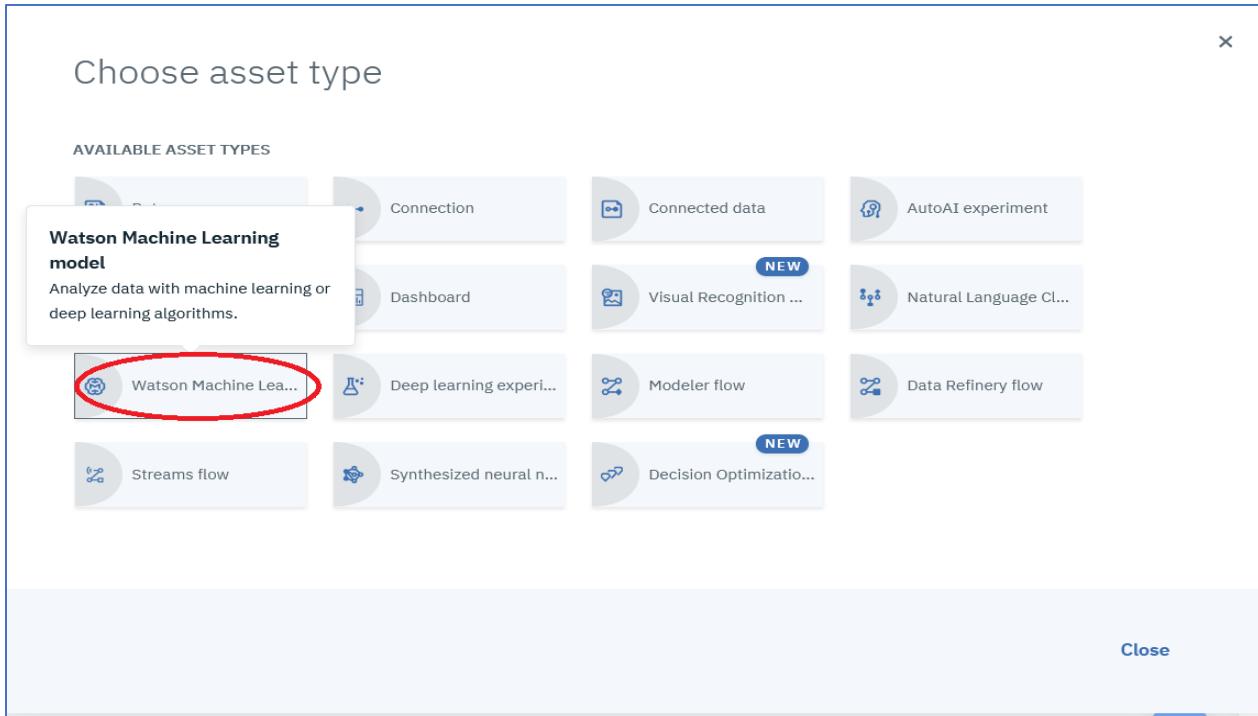


Import the Credit Risk Model

- 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' with a table. The table has columns: NAME, TYPE, CREATED BY, LAST MODIFIED, and ACTIONS. A message at the bottom of the table says '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.			

Add Deployment +

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
credit-risk-deploy

Description
Deployment 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.

MODEL
credit-risk

Overview Evaluation Deployments Lineage

Add Deployment +

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

Provision Watson OpenScale.

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

IBM Watson Studio

My Projects / Watson

credit-risk-deploy

Overview

Open Link in New Tab

Open Link in New Window

Open Link in New Private Window

Bookmark This Link

Save Link As...

Save Link to Pocket

Copy Link Location

Search Google for "IBM Watson Stud..."

Send Link to Device

Inspect Element (Q)

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



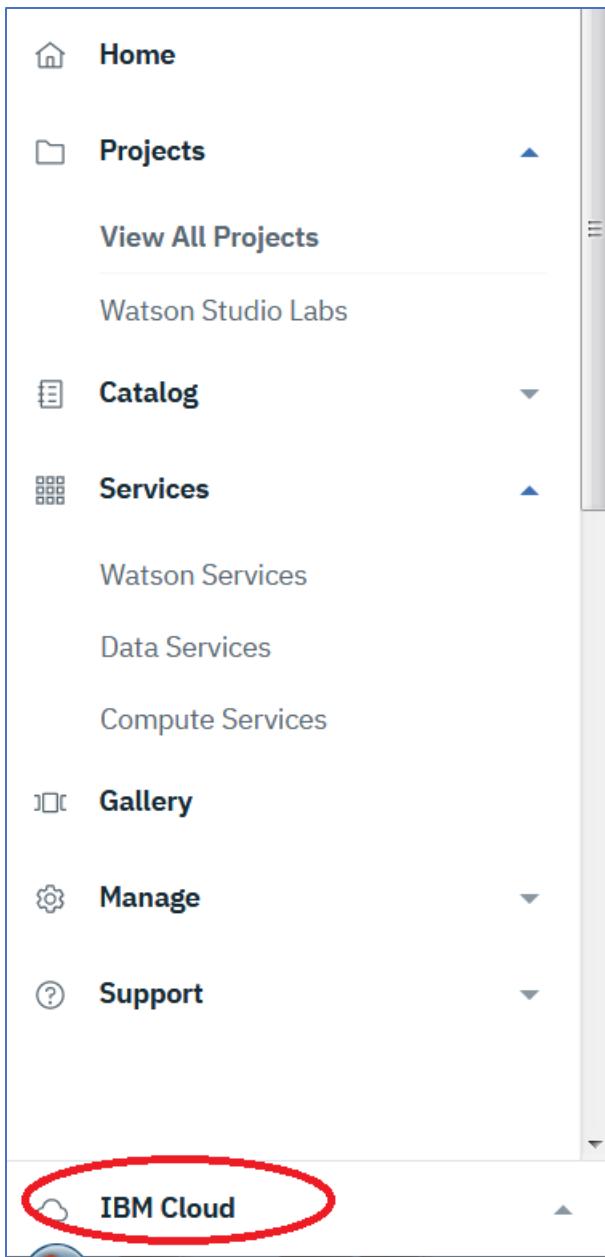
3. Click on the hamburger icon in the top left corner.

IBM Watson Studio

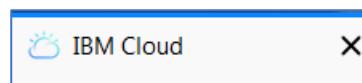
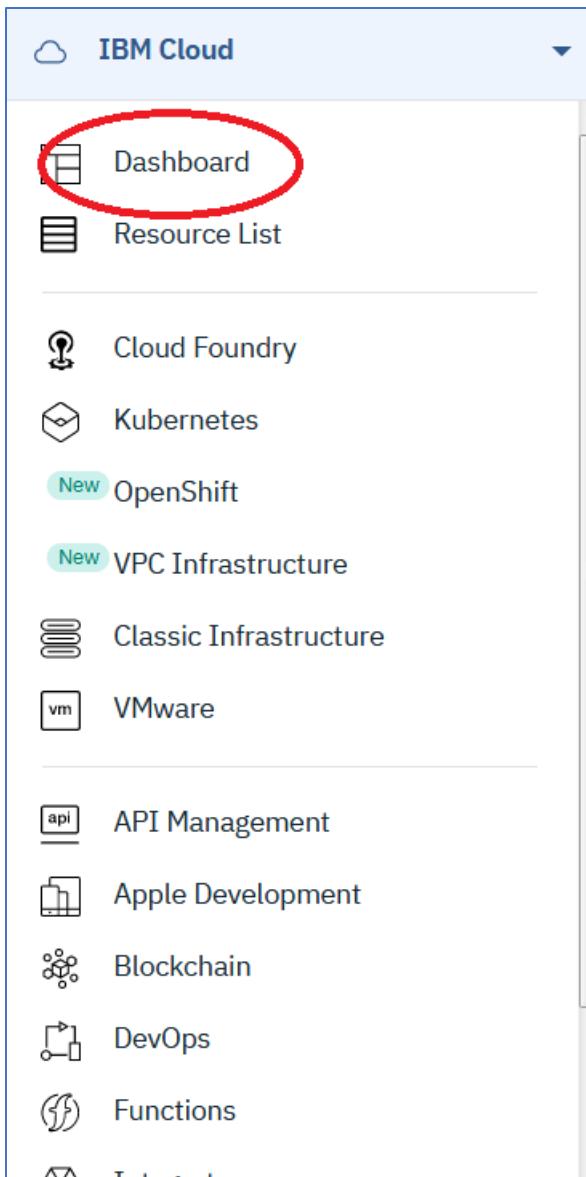
My Projects / Watson Studio Labs / credit-risk

Upgrade Feliz Doe's Account

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)

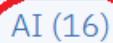
VPC Infrastructure

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)

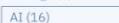
VPC Infrastructure

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 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 resource page for Watson OpenScale-13. It includes a sidebar for 'Manage Plan'. The main area shows the resource name 'Watson OpenScale-13', its location 'Dallas', and a 'Launch Application' button. The 'Launch Application' button 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 top navigation bar has three tabs: "Overview", "Implementation", and "Test", with "Test" being the active tab. Below the tabs, there is a section titled "Enter input data". Inside this section, there is a code editor containing the following JSON payload:

```
{  
  "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 "Enter input data" section, there is a blue "Predict" button. This button is circled with a red oval, indicating it is the target for the user's click. To the right of the code editor, there are standard window control buttons (minimize, maximize, close) and scroll bars.

6. The results should appear as below.

credit-risk-deploy

Overview Implementation **Test**

Enter input data

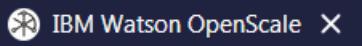
```
{  
  "fields":  
    ["CheckingStatus", "LoanDuration", "CreditHistory", "Loa  
    nPurpose", "LoanAmount", "ExistingSavings", "Employme  
    ntDuration", "InstallmentPercent", "Sex", "OthersOnLoan  
    , "CurrentResidenceDuration", "OwnsProperty", "Age", "I  
    nstallmentPlans", "Housing", "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

Payload logging

Model details

Quality

Fairness

Explainability

Drift

Specify type of input

Select the type of data the deployment analyzes and the algorithm type.

Data type ⓘ

Numeric/categorical

Algorithm type

Binary classification

Save

This screenshot shows the 'Specify type of input' configuration page. It includes dropdown menus for 'Data type' (set to 'Numeric/categorical') and 'Algorithm type' (set to 'Binary classification'), both of which are circled in red. A blue 'Save' button at the bottom is also circled in red. The left sidebar lists other configuration options like Model details, Quality, Fairness, Explainability, and Drift.

- 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

Payload logging

Model details

Quality

Fairness

Explainability

Drift

Payload logging

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.

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.

Logging activated successfully. Proceed by completing the model details step.

Details

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

View API Specification | Download

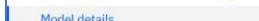
This screenshot shows the 'Payload logging' configuration page. The 'Model details' section is circled in red. A success message 'Logging activated successfully. Proceed by completing the model details step.' is displayed. Below it is a 'Details' table showing deployment information: Deployment name (credit-risk-deploy), Data type (Numeric/categorical), Algorithm type (Binary classification), Datamart ID (52876bf1-a1bc-4e53-af1a-4dbf3dd7baef), and Feedback table name (Feedback_a9df74f8-869d-4896-9880-cd6671065daa). There is also a 'View API Specification | Download' link.

- 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.



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

Dashboard / Configure

credit-risk-deploy

Payload logging 

Model details 

Quality

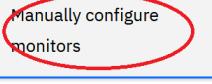
Fairness

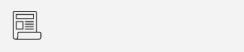
Explainability

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.

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

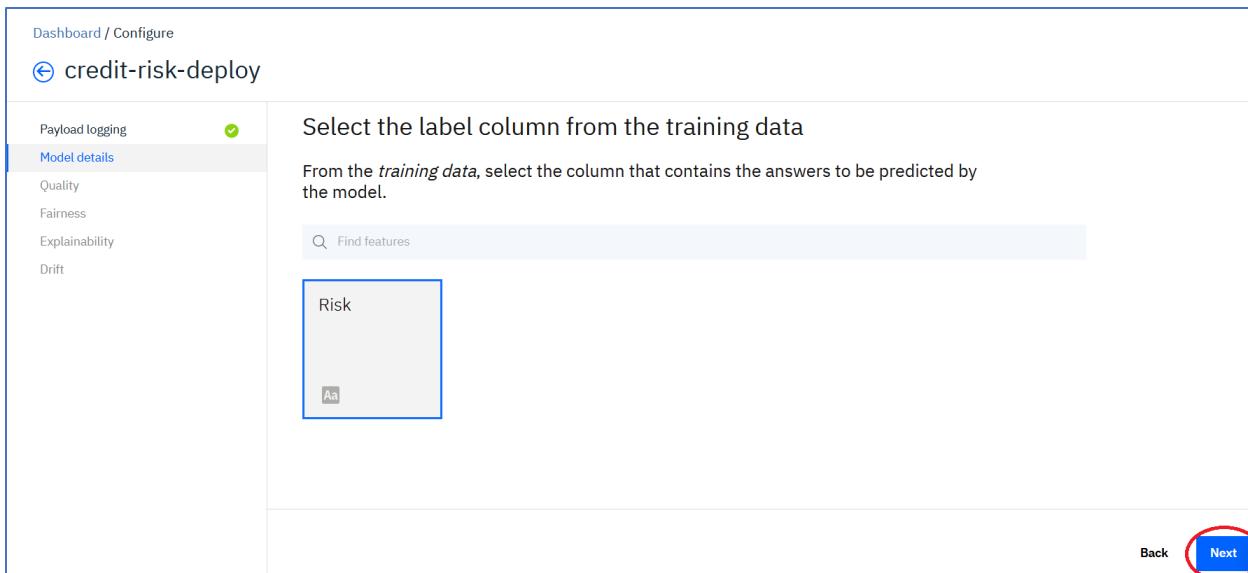
From the *training data*, select the column that contains the answers to be predicted by the model.

Find features

Risk

Aa

Back Next



This screenshot shows the 'Configure' step of the Watson OpenScale setup. The 'Model details' section is selected. A sidebar on the left lists 'Payload logging' (checked), 'Model details' (checked), and other quality-related options like 'Fairness' and 'Explainability'. The main area asks to select a 'label column' from training data, with a search bar and a list containing 'Risk' (selected). At the bottom right are 'Back' and 'Next' buttons, with 'Next' circled in red.

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

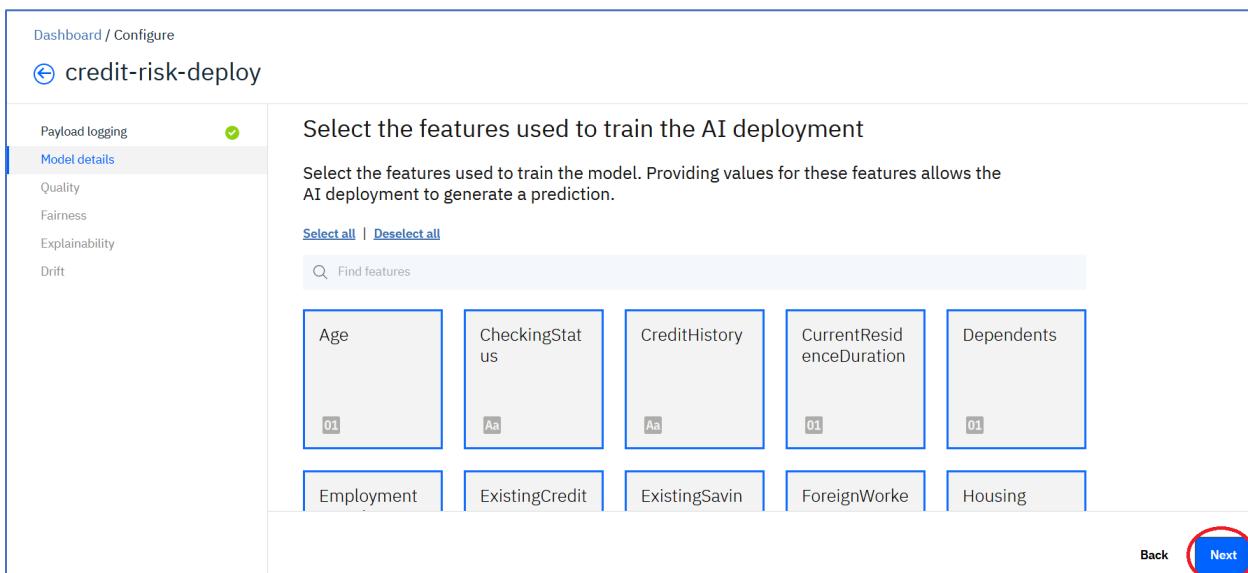
ExistingCredit

ExistingSavin

ForeignWorker

Housing

Back Next



This screenshot shows the 'Configure' step of the Watson OpenScale setup. The 'Model details' section is selected. A sidebar on the left lists 'Payload logging' (checked), 'Model details' (checked), and other quality-related options like 'Fairness' and 'Explainability'. The main area asks to select features for training, with a search bar and a grid of ten features: Age (01), CheckingStatus (Aa), CreditHistory (Aa), CurrentResidenceDuration (01), Dependents (01), Employment, ExistingCredit, ExistingSavin, ForeignWorker, and Housing. At the bottom right are 'Back' and 'Next' buttons, with 'Next' circled in red.

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
Employment Duration	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> <div style="display: flex; justify-content: space-around; align-items: center;"> CheckingStatus CreditHistory LoanPurpose ExistingSavings EmploymentDuration </div> <div style="text-align: right; margin-top: 10px;"> Back Next </div>
--	---

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>Model details summary</p> <p>That's it! Review the summary and click Save to complete setup.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Location of training data</td> <td style="padding: 5px;">Edit</td> </tr> <tr> <td colspan="2" style="padding: 5px;">dashdb-entry-yp-dal09-10.services.dal.bluemix.net</td> </tr> <tr> <td style="padding: 5px;">Training schema</td> <td style="padding: 5px;">Edit</td> </tr> <tr> <td colspan="2" style="padding: 5px;">DASH14512</td> </tr> <tr> <td style="padding: 5px;">Training table</td> <td style="padding: 5px;">Edit</td> </tr> <tr> <td colspan="2" style="padding: 5px;">CREDIT_RISK_TRAIN_DATA</td> </tr> <tr> <td style="padding: 5px;">Label column</td> <td style="padding: 5px;">Edit</td> </tr> <tr> <td colspan="2" style="padding: 5px;">Risk</td> </tr> <tr> <td style="padding: 5px;">Features used to train the AI deployment</td> <td style="padding: 5px;">Edit</td> </tr> </table> <div style="text-align: right; margin-top: 10px;"> Back Save </div>	Location of training data	Edit	dashdb-entry-yp-dal09-10.services.dal.bluemix.net		Training schema	Edit	DASH14512		Training table	Edit	CREDIT_RISK_TRAIN_DATA		Label column	Edit	Risk		Features used to train the AI deployment	Edit
Location of training data	Edit																		
dashdb-entry-yp-dal09-10.services.dal.bluemix.net																			
Training schema	Edit																		
DASH14512																			
Training table	Edit																		
CREDIT_RISK_TRAIN_DATA																			
Label column	Edit																		
Risk																			
Features used to train the AI deployment	Edit																		

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

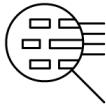
Edit

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.
Quality		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.
Quality		Minimum sample size required before evaluation ⓘ
Fairness		10 ————— 2,000 100
Explainability	✓	Note: For amounts higher than 2,000, enter the value into the field.
Drift		

Maximum sample size to evaluate ⓘ

10 ————— 50,000 **10000**

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	✓
Quality	
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	✓
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

[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

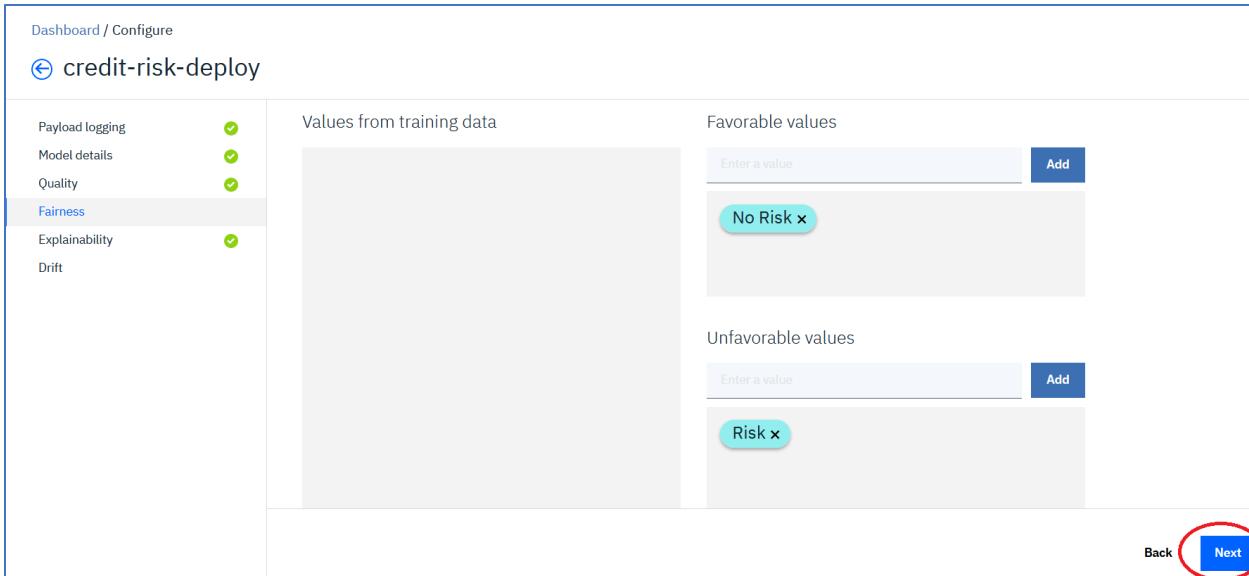
credit-risk-deploy

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

Unfavorable values

Enter a value <input type="text"/> Add	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

Payload logging	✓	Select the features to monitor
Model details	✓	For each feature you select, Watson OpenScale will monitor the deployed model's propensity for a favorable outcome for one over the other.
Quality	✓	
Fairness		Features are monitored individually, but any debiasing will correct issues for all features together.
Explainability	✓	
Drift		

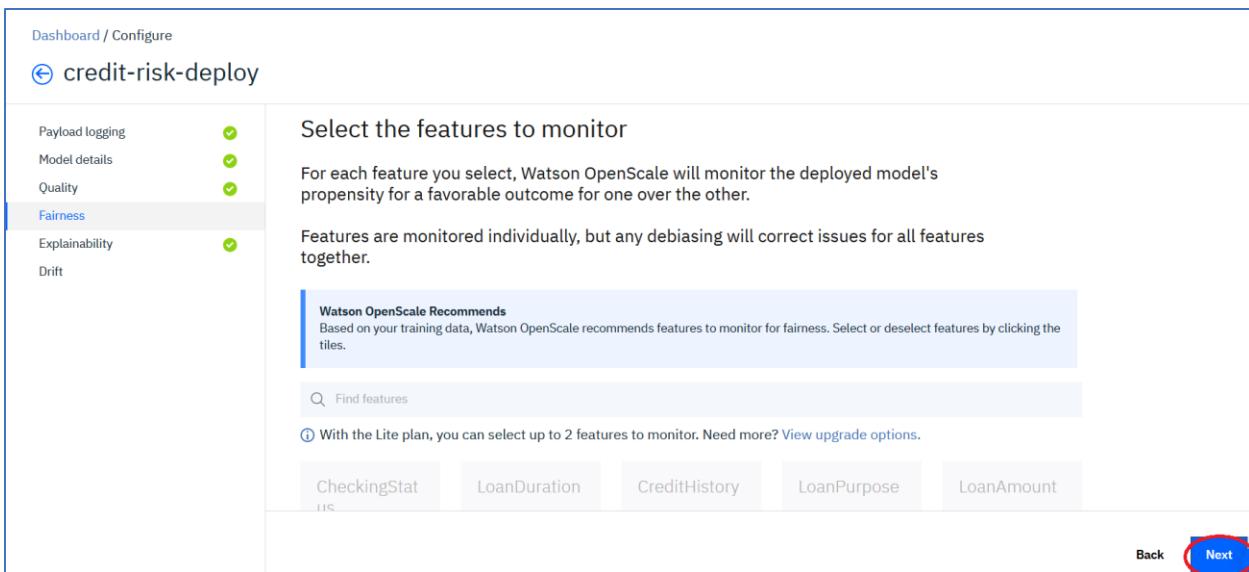
Watson OpenScale Recommends
Based on your training data, Watson OpenScale recommends features to monitor for fairness. Select or deselect features by clicking the tiles.

Find features

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

CheckingStat 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;"> ✓ 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; border-radius: 5px; margin-top: 10px;"> Watson OpenScale Recommends 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="display: flex; align-items: center; justify-content: space-between;"> 1% 80 <input style="width: 100%; height: 2px; background-color: #ccc; border: none; appearance: none; margin: 0 auto; position: relative; z-index: 1; border-radius: 5px; transition: width 0.3s; border: 1px solid #ccc; border-radius: 5px; width: 100%; height: 2px; background-color: #ccc; border: none; appearance: none; margin: 0 auto; position: relative; z-index: 1; border-radius: 5px; transition: width 0.3s;" type="range" value="80"/> 100% 95% Fair </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 — **200** — 2,000

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

Back **Next**

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 **Save**

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**.

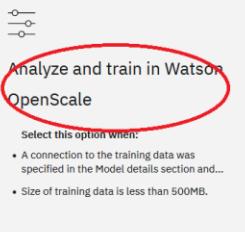
Dashboard / Configure

credit-risk-deploy

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

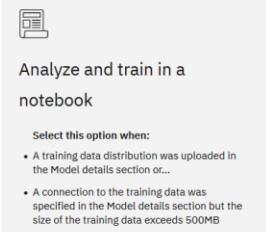
Configure accuracy drift monitor

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%  99% 10%

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

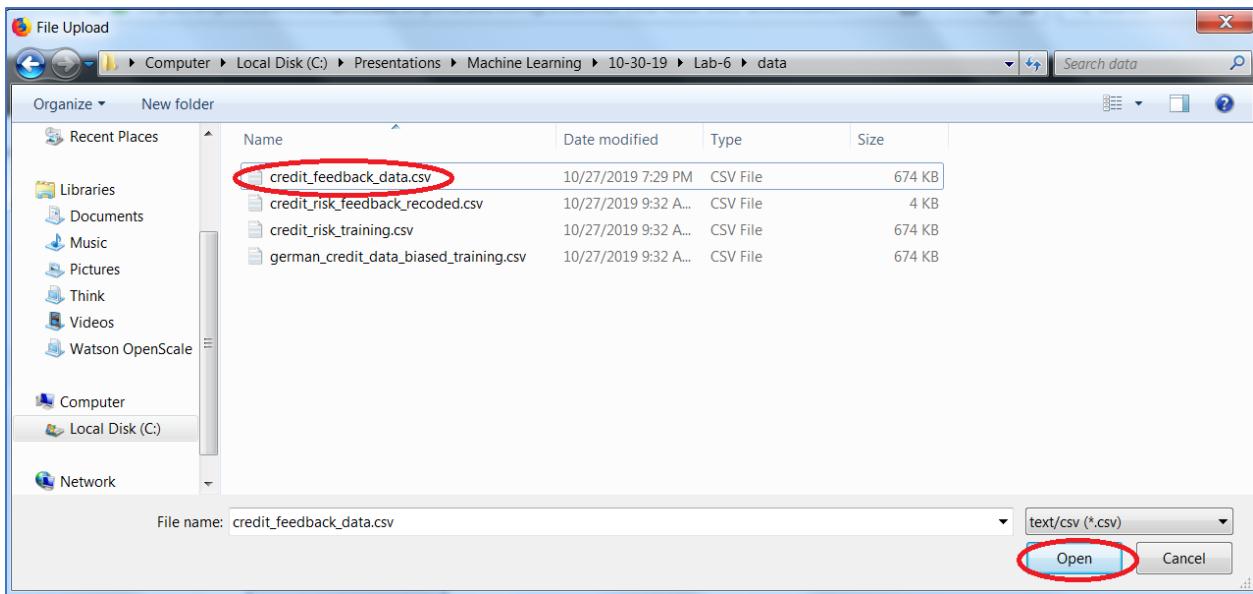
Watson OpenScale provides an endpoint for sending fresh test data for ongoing quality evaluation. You can upload feedback data here or work with your developer to integrate the code snippet provided to publish feedback data to your Watson OpenScale database.

Add Feedback Data

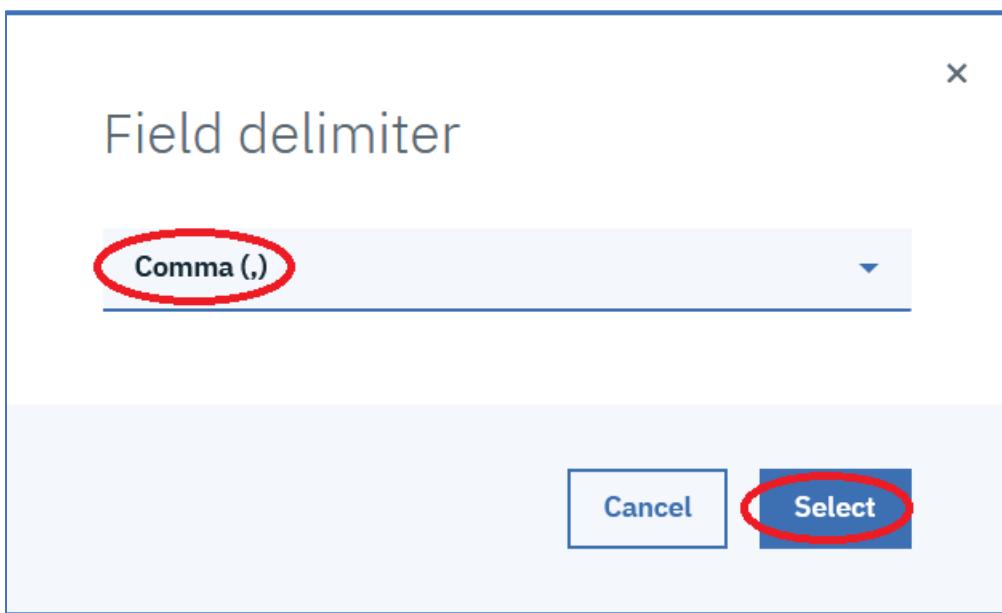
Details

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.

The screenshot shows the Watson OpenScale interface for a deployment named 'credit-risk-deploy'. On the left, there's a sidebar with various monitoring categories like Payload logging, Model details, Quality, Fairness, Explainability, and Drift. The 'Quality' category is selected and highlighted in blue. The main content area is titled 'Quality' and displays the message 'The Quality monitor is configured.' Below this, there are two tabs: 'Overview' and 'Feedback', with 'Feedback' being the active tab. A note from Watson OpenScale explains that it provides an endpoint for sending fresh test data for ongoing quality evaluation. A success message at the bottom of this section says 'credit_feedback_data.csv uploaded successfully' with an 'OK' button. At the bottom right of the main content area, there are links for 'View API Specification' and 'Download', and a blue 'Edit' button.

10. Click on **Monitor Models**.

The screenshot shows the 'Insights Dashboard' with a title 'Insights Dashboard'. Below the title, there are two sections: 'Application Monitors beta' (0) and 'Model Monitors' (1). The 'Model Monitors' section is circled in red. The 'Model Monitors' section has a blue header with the text 'Model Monitors' and a grey background. The number '1' is displayed in white on the right side of this section.

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 <i>beta</i>	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

Configure monitors

Remove deployment

Quality N/A

N/A N/A

Evaluation pending

A red circle highlights the "View details" button in the dropdown menu.

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 (highlighted with a red circle)

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

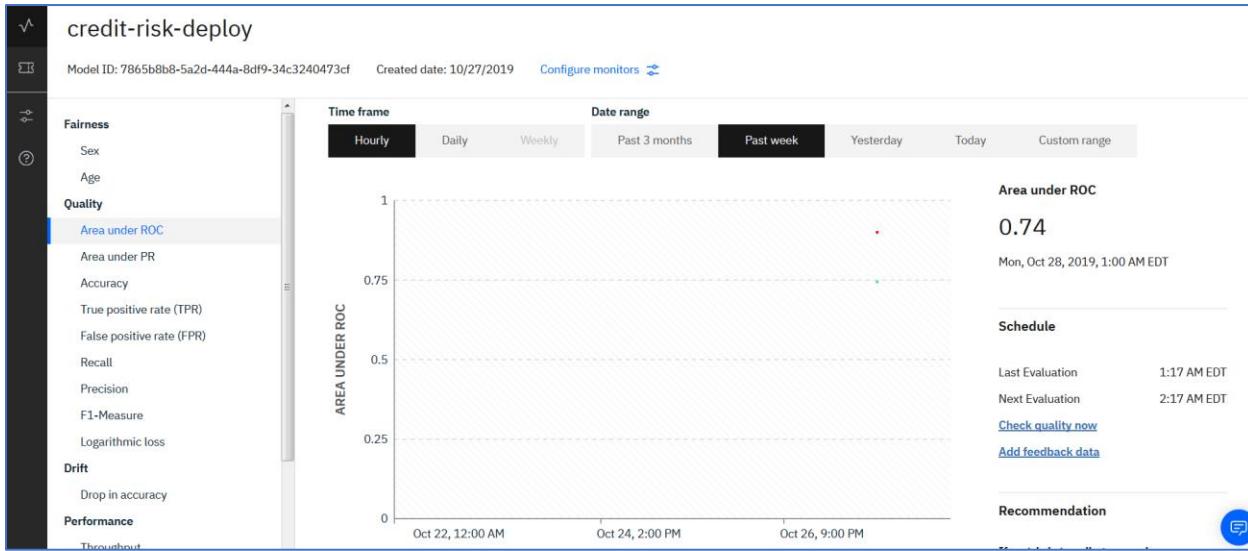
Schedule

Last Evaluation Not yet evaluated
Next Evaluation N/A
Check quality now (highlighted with a red circle)
[Add feedback data](#)

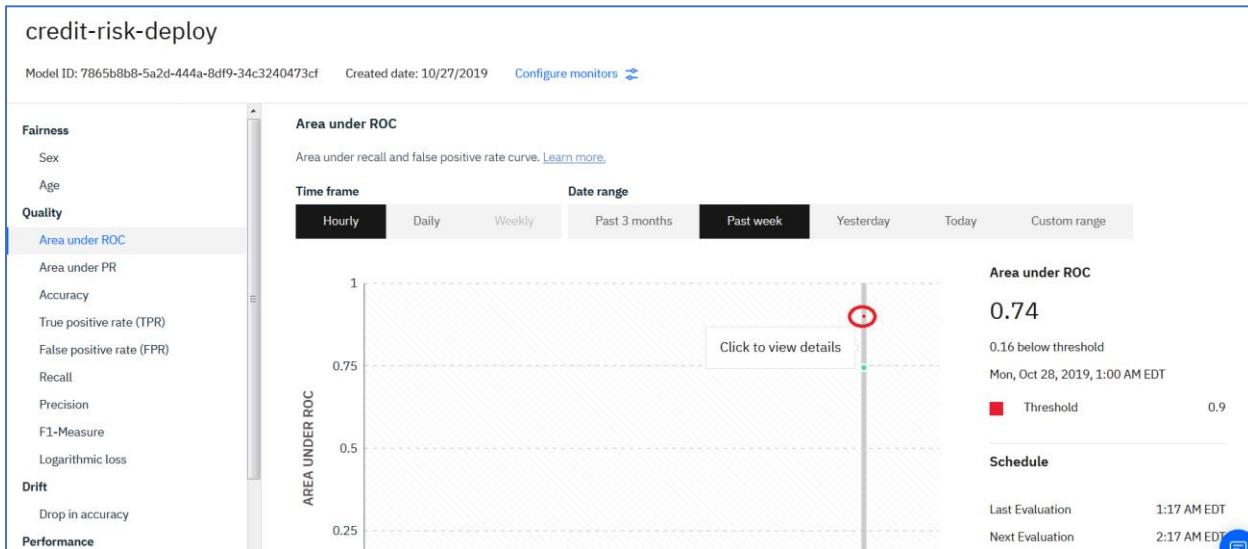
Recommendation

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

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*

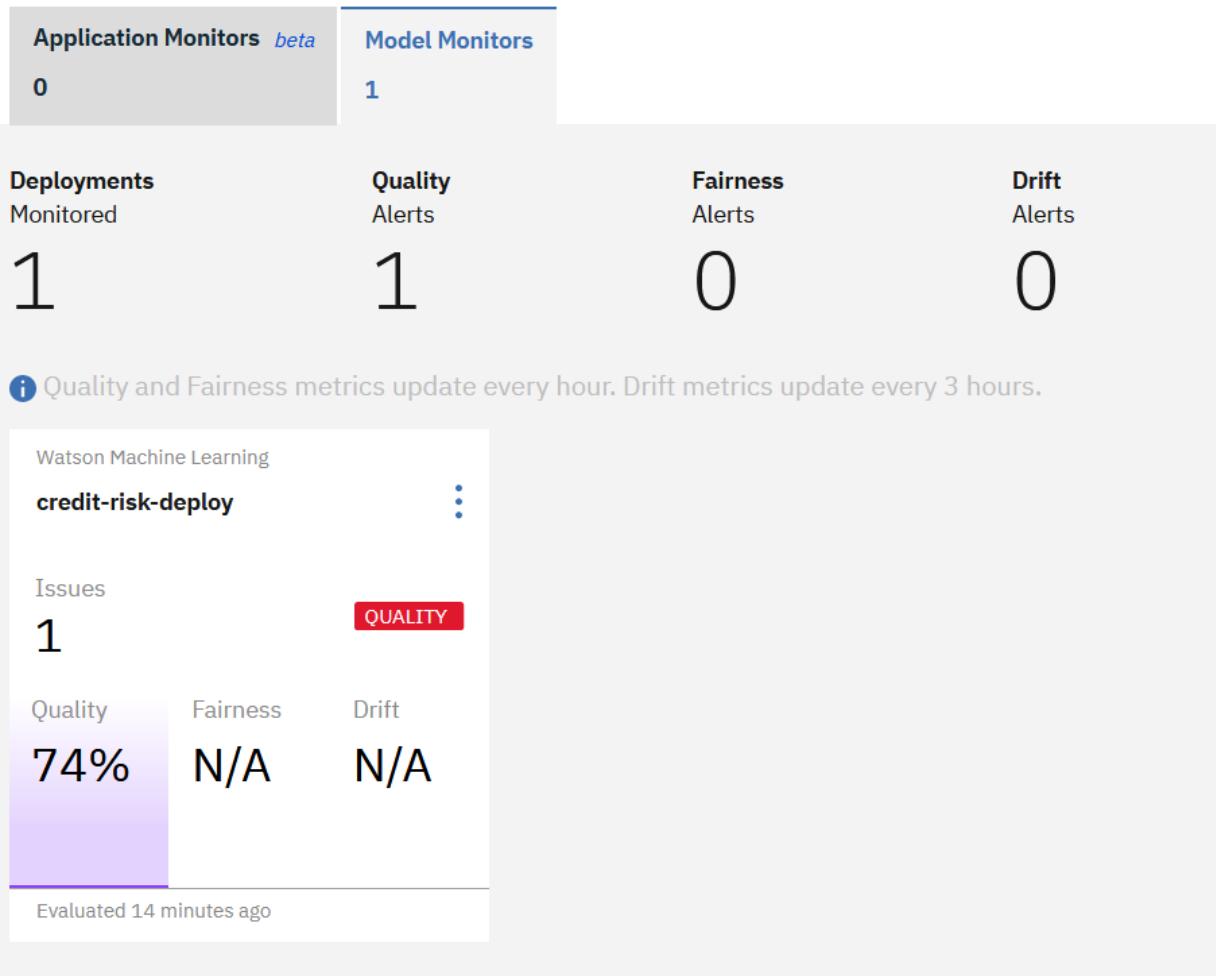
0

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 main area has tabs for "Overview", "Implementation", and "Test", with "Test" currently selected. 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 Watson Studio interface as the first one, but with a red oval highlighting the "Predict" button at the bottom left of the "Enter input data" section.

6. The result is displayed below.

The screenshot shows the IBM Watson Studio interface. In the center, there's a text input area labeled "Enter input data" containing a JSON object. This object defines various fields such as CheckingStatus, LoanDuration, CreditHistory, etc. A red rectangular box highlights this JSON input area. Below the input area is a blue "Predict" button. The top navigation bar shows "credit-risk-deploy" under "My Projects".

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 displays "Application Monitors beta" (0) and "Model Monitors" (1). Below this, four metrics are shown: Deployments Monitored (1), Quality Alerts (1), Fairness Alerts (0), and Drift Alerts (0). A note indicates that Quality and Fairness metrics update every hour, while Drift metrics update every 3 hours. A section for "Watson Machine Learning" shows a deployment named "credit-risk-deploy". To the right of the deployment name is a blue circular icon with three dots, which is circled in red in the screenshot. Below this, there's a summary of "Issues" (1) with a "QUALITY" status. Under "Quality", a score of 74% is shown. The bottom of the dashboard indicates it was "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%

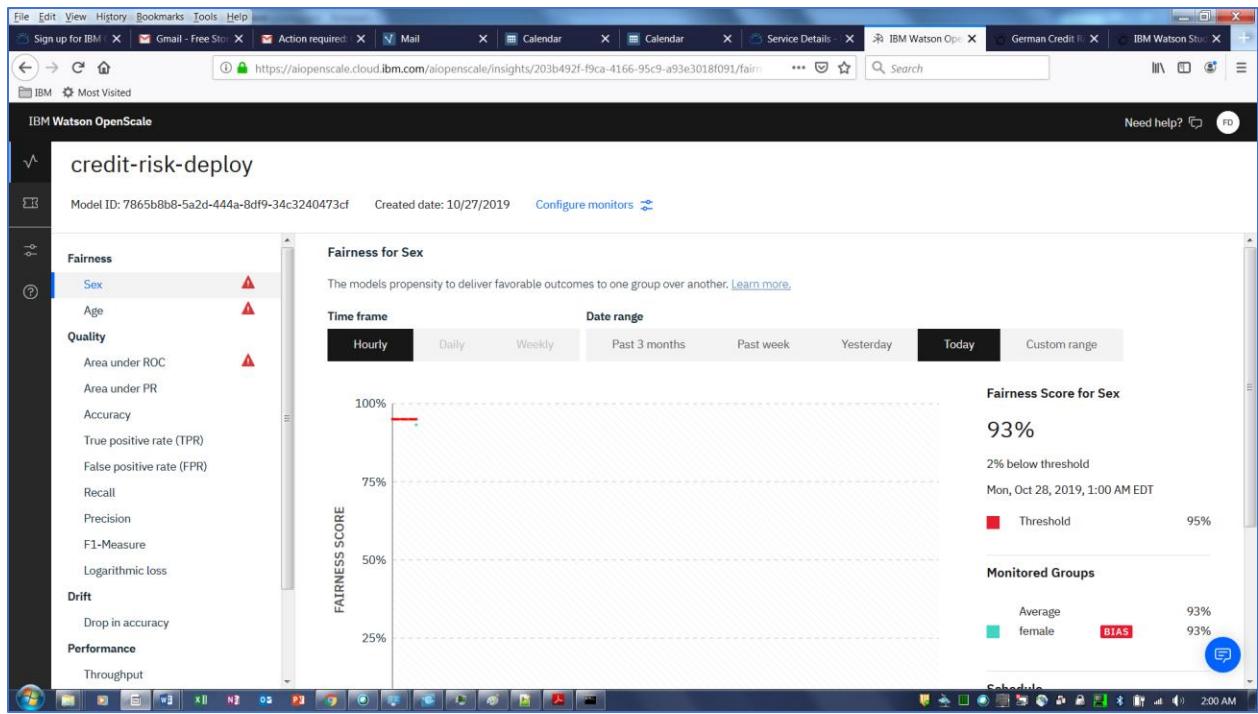
Fairness N/A

Evaluated 2 minutes ago

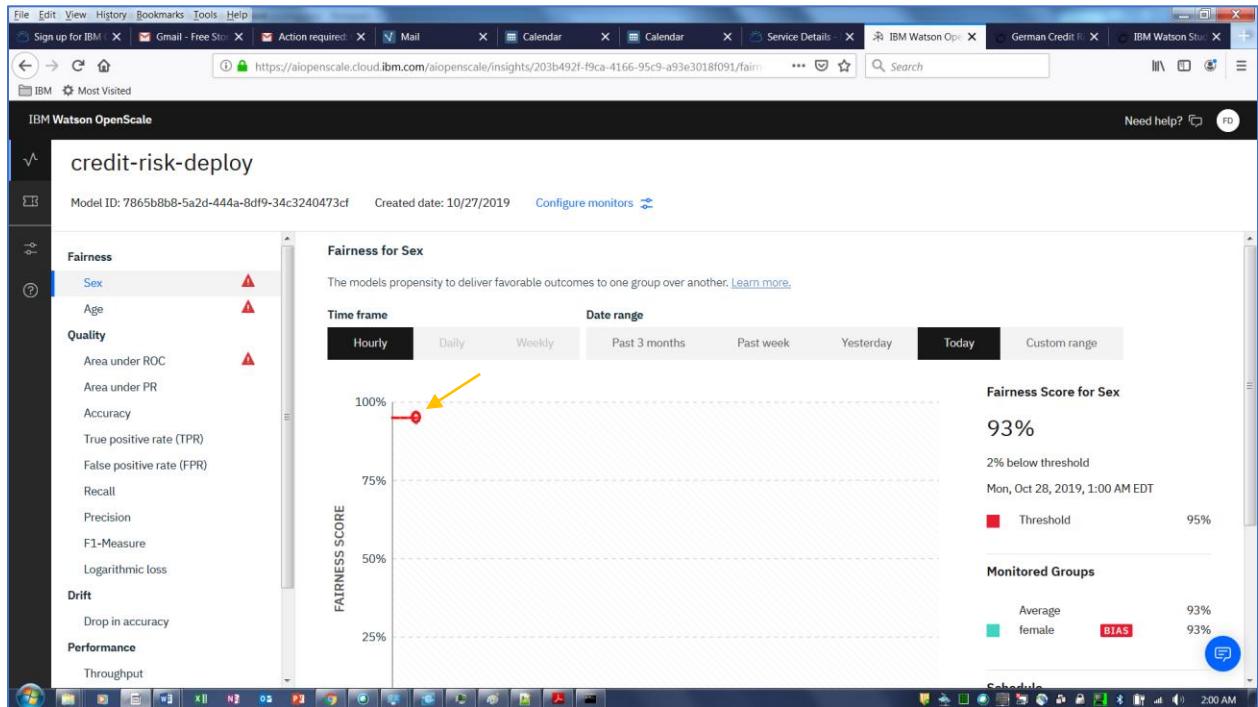
⋮

- View details
- Configure monitors
- Remove deployment

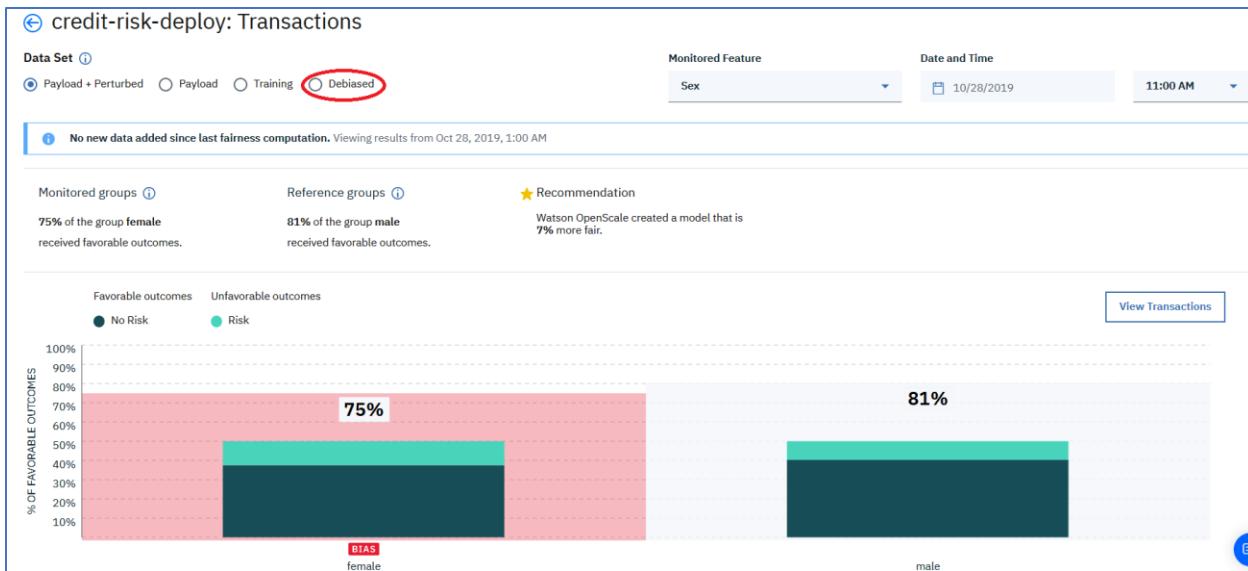
10. The Fairness score for sex is 2% below the threshold and triggers an alert.



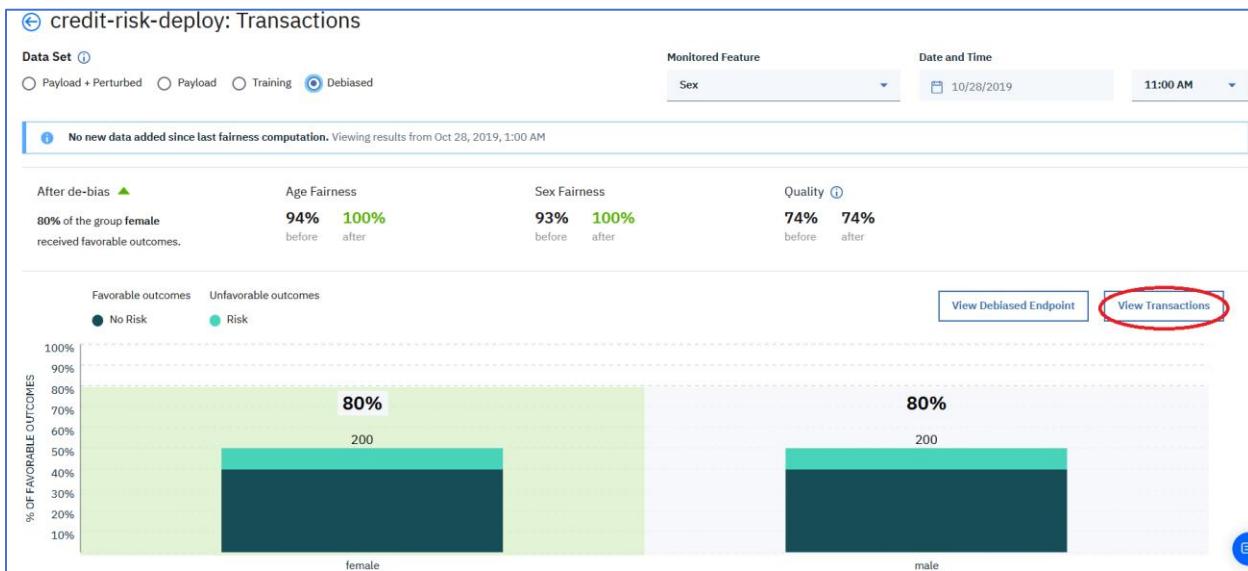
11. Click on the “red dot” to view more details.



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



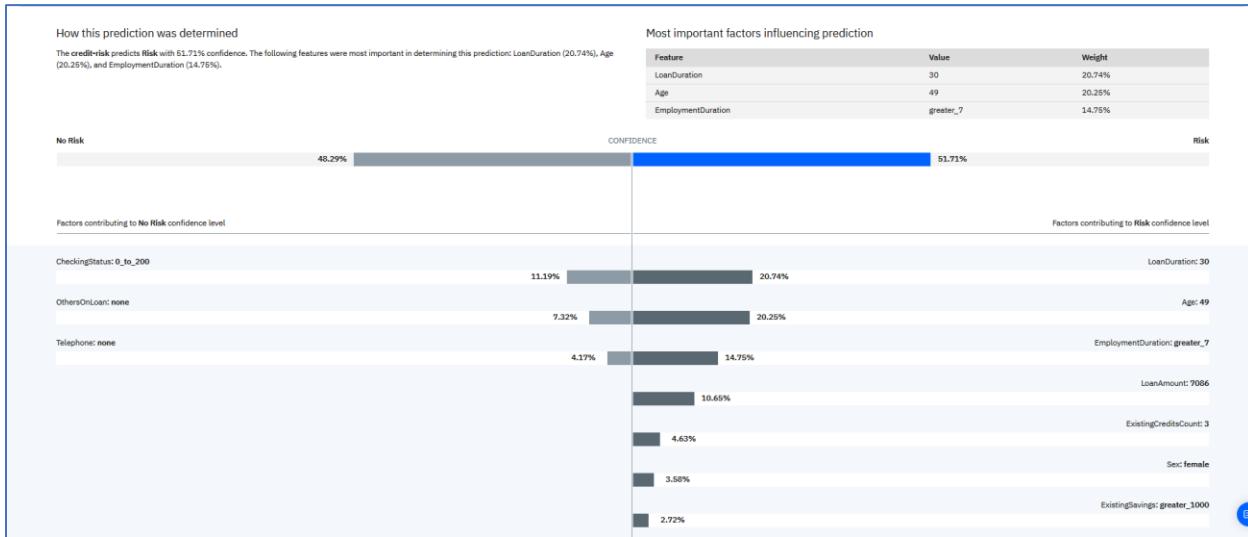
13. The results show that applying a debiasing scheme will reduce the bias to zero. The endpoint for invoking the debiasing algorithm can be obtained by clicking on View Debiased Endpoint. For now, click on **View Transaction** to display a list of transactions.



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.

The screenshot shows the IBM Watson OpenScale interface. At the top, there are several tabs: "Server Not Found", "Action required: Config", "Service Details - IBM", "IBM Watson OpenScale" (which is active), "German Credit Risk - IBM", "IBM Watson Studio", "IBM Cloud", and "raw.githubusercontent.com". The main content area has a header "IBM Watson OpenScale" with a "Need help?" link. Below this, a message says "No new data added since last fairness computation. Viewing results from Oct 28, 2019, 1:00 AM". A sidebar on the left shows "View" options: "All transactions" (selected) and "Biased transactions". A note below says "Review the transactions that were received for the selected time period. Click an Explain link to determine the features that contributed to each outcome." The main table lists transactions with columns: Transaction ID, Sex, Bias Detected, Outcome, and Action. One row's "Action" column contains a blue "Explain" link, which is circled in red. To the right, there are two bar charts under "Payload Table": "No Risk : Favorable Outcome" and "Risk : Unfavorable Outcome". The first chart compares "Current Model" and "De-biased Model" for both outcomes.

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.



You have completed the Lab!!!

Explain a Transaction