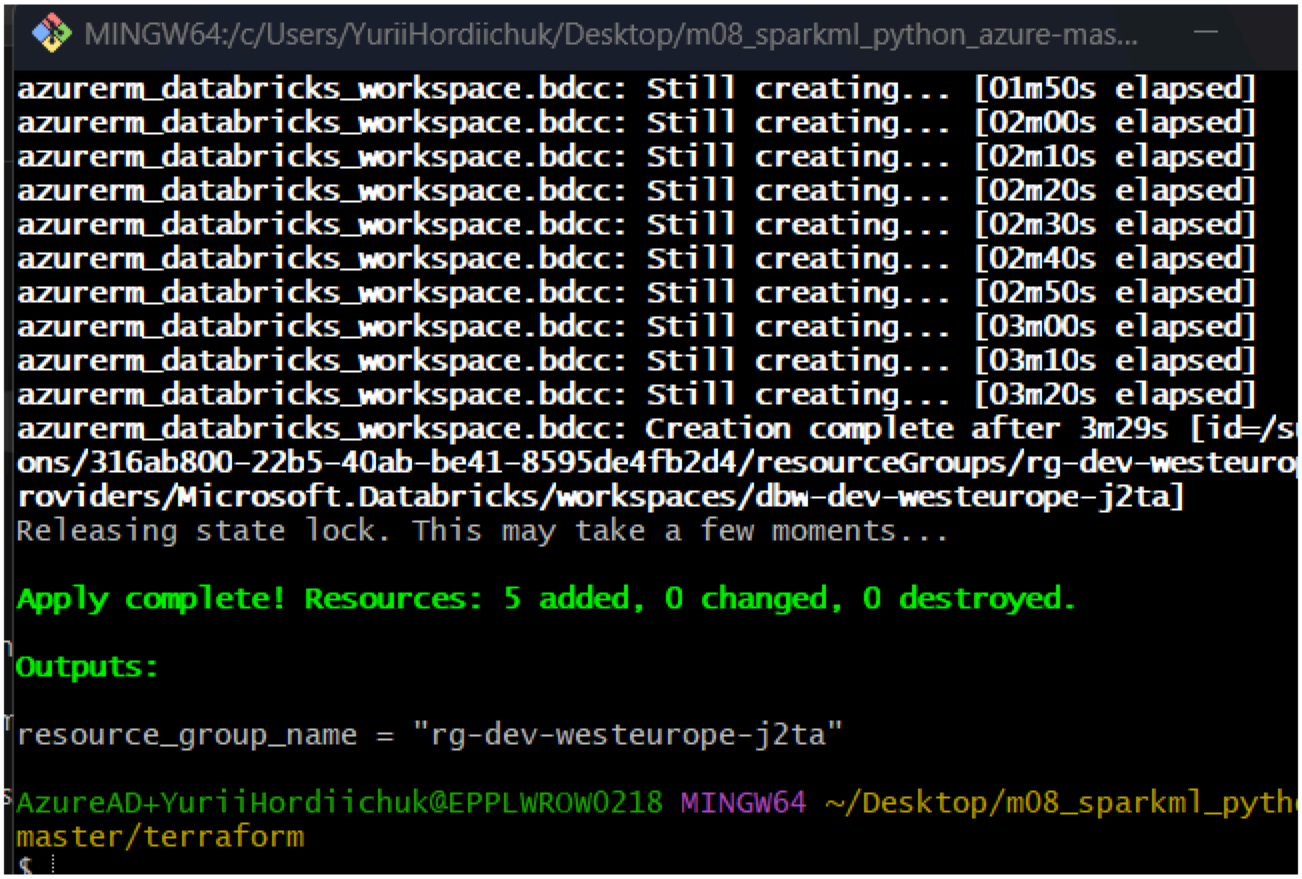
SPARK ML

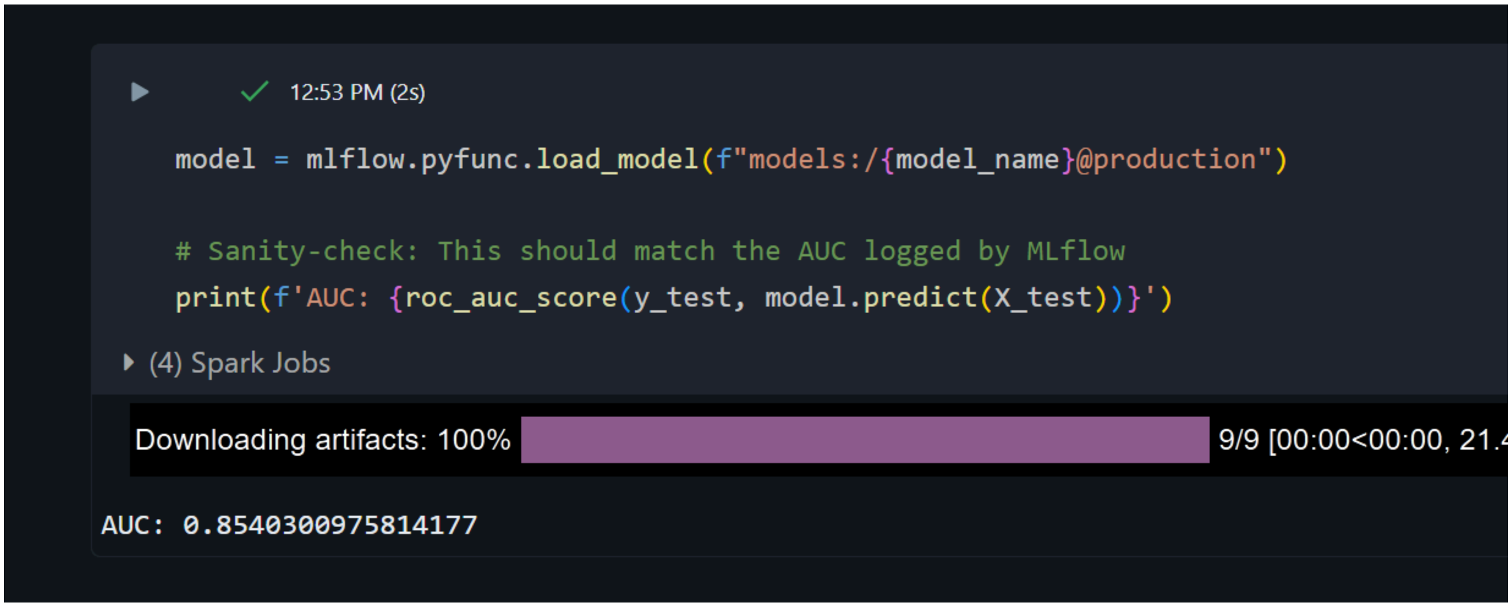
1.Terraform Apply:



MINGW64:/c/Users/YuriiHordiichuk/Desktop/m08_sparkml_python_azure-mas...

```
azurerm_databricks_workspace.bdcc: Still creating... [01m50s elapsed]
azurerm_databricks_workspace.bdcc: Still creating... [02m00s elapsed]
azurerm_databricks_workspace.bdcc: Still creating... [02m10s elapsed]
azurerm_databricks_workspace.bdcc: Still creating... [02m20s elapsed]
azurerm_databricks_workspace.bdcc: Still creating... [02m30s elapsed]
azurerm_databricks_workspace.bdcc: Still creating... [02m40s elapsed]
azurerm_databricks_workspace.bdcc: Still creating... [02m50s elapsed]
azurerm_databricks_workspace.bdcc: Still creating... [03m00s elapsed]
azurerm_databricks_workspace.bdcc: Still creating... [03m10s elapsed]
azurerm_databricks_workspace.bdcc: Still creating... [03m20s elapsed]
azurerm_databricks_workspace.bdcc: Creation complete after 3m29s [id=/su
ons/316ab800-22b5-40ab-be41-8595de4fb2d4/resourceGroups/rg-dev-westeuro
roviders/Microsoft.Databricks/workspaces/dbw-dev-westeurope-j2ta]
Releasing state lock. This may take a few moments...

Apply complete! Resources: 5 added, 0 changed, 0 destroyed.

Outputs:

resource_group_name = "rg-dev-westeurope-j2ta"

AzureAD+YuriiHordiichuk@EPPLWROW0218 MINGW64 ~/Desktop/m08_sparkml_pytho
master/terraform
$
```

2.Baseline model result:



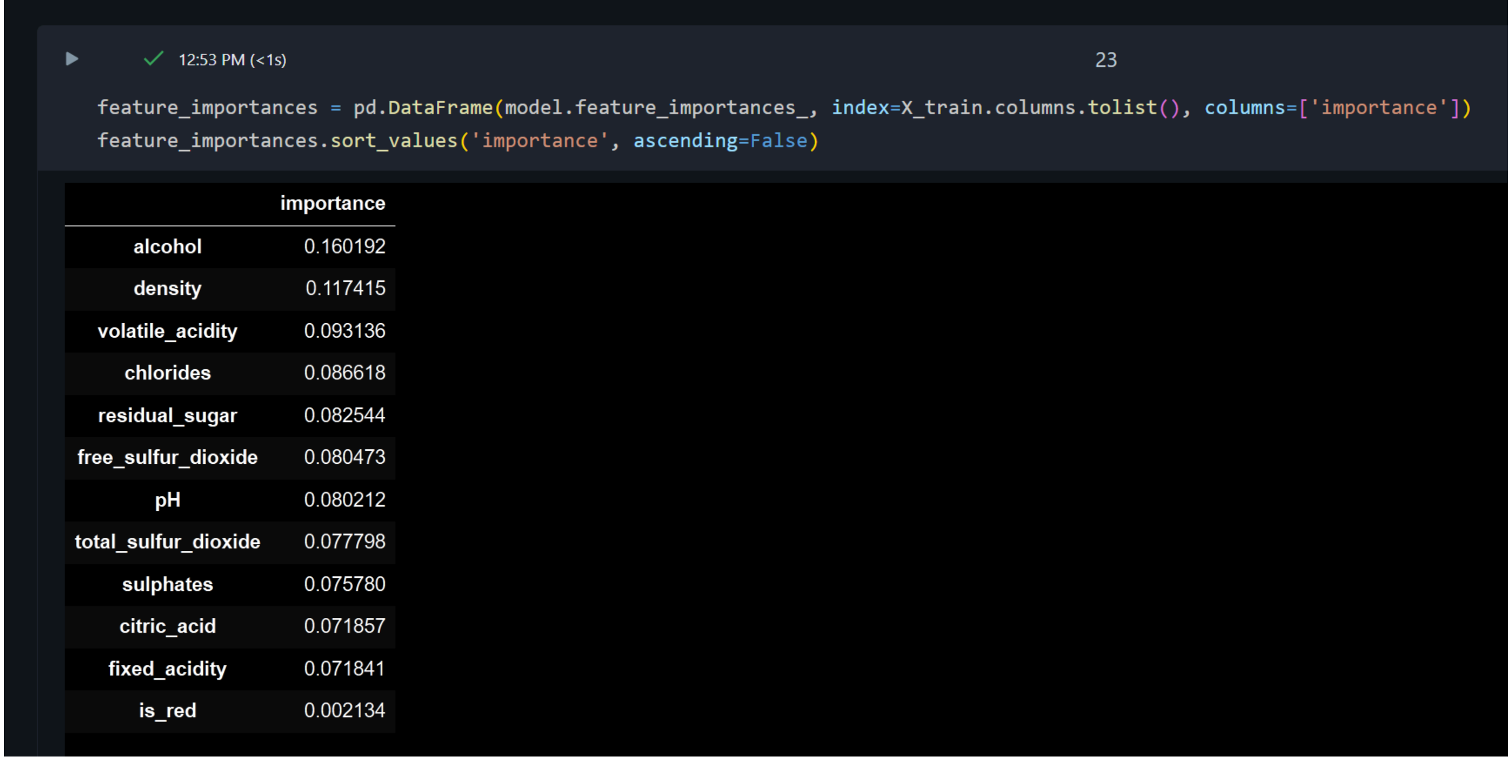
12:53 PM (2s)

```
model = mlflow.pyfunc.load_model(f"models:/{model_name}@production")

# Sanity-check: This should match the AUC logged by MLflow
print(f'AUC: {roc_auc_score(y_test, model.predict(X_test))}')
```

(4) Spark Jobs

```
Downloading artifacts: 100% 9/9 [00:00<00:00, 21.

AUC: 0.8540300975814177
```

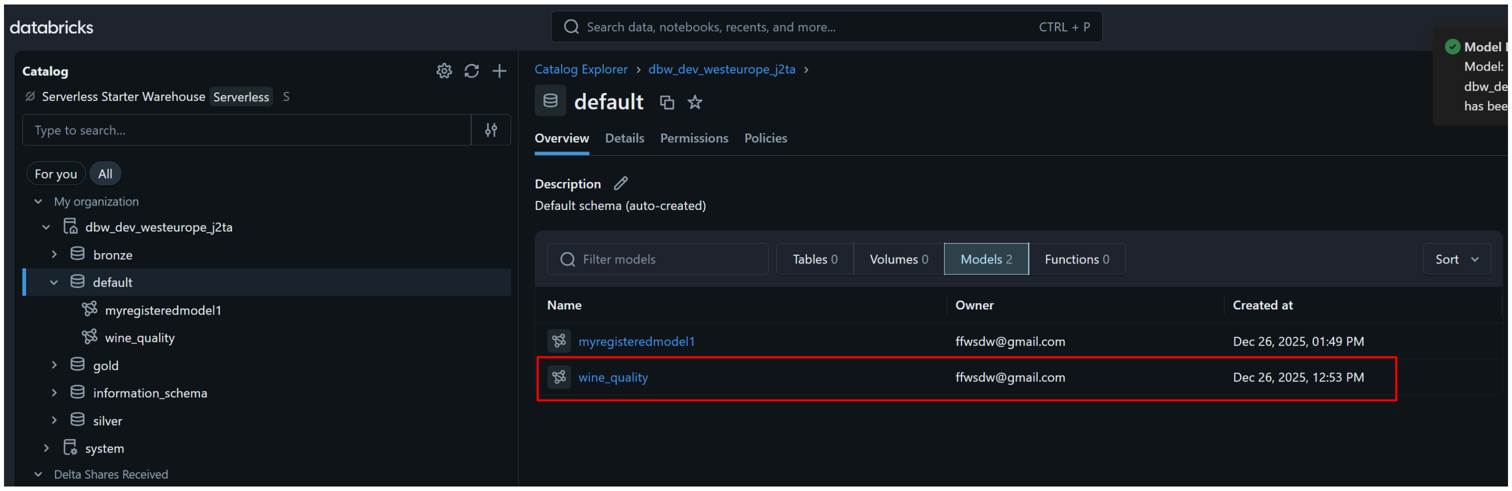
Features importance:



```
12:53 PM (<1s)                                   23

feature_importances = pd.DataFrame(model.feature_importances_, index=X_train.columns.tolist(), columns=['importance'])
feature_importances.sort_values('importance', ascending=False)
```

	importance
alcohol	0.160192
density	0.117415
volatile_acidity	0.093136
chlorides	0.086618
residual_sugar	0.082544
free_sulfur_dioxide	0.080473
pH	0.080212
total_sulfur_dioxide	0.077798
sulphates	0.075780
citric_acid	0.071857
fixed_acidity	0.071841
is_red	0.002134

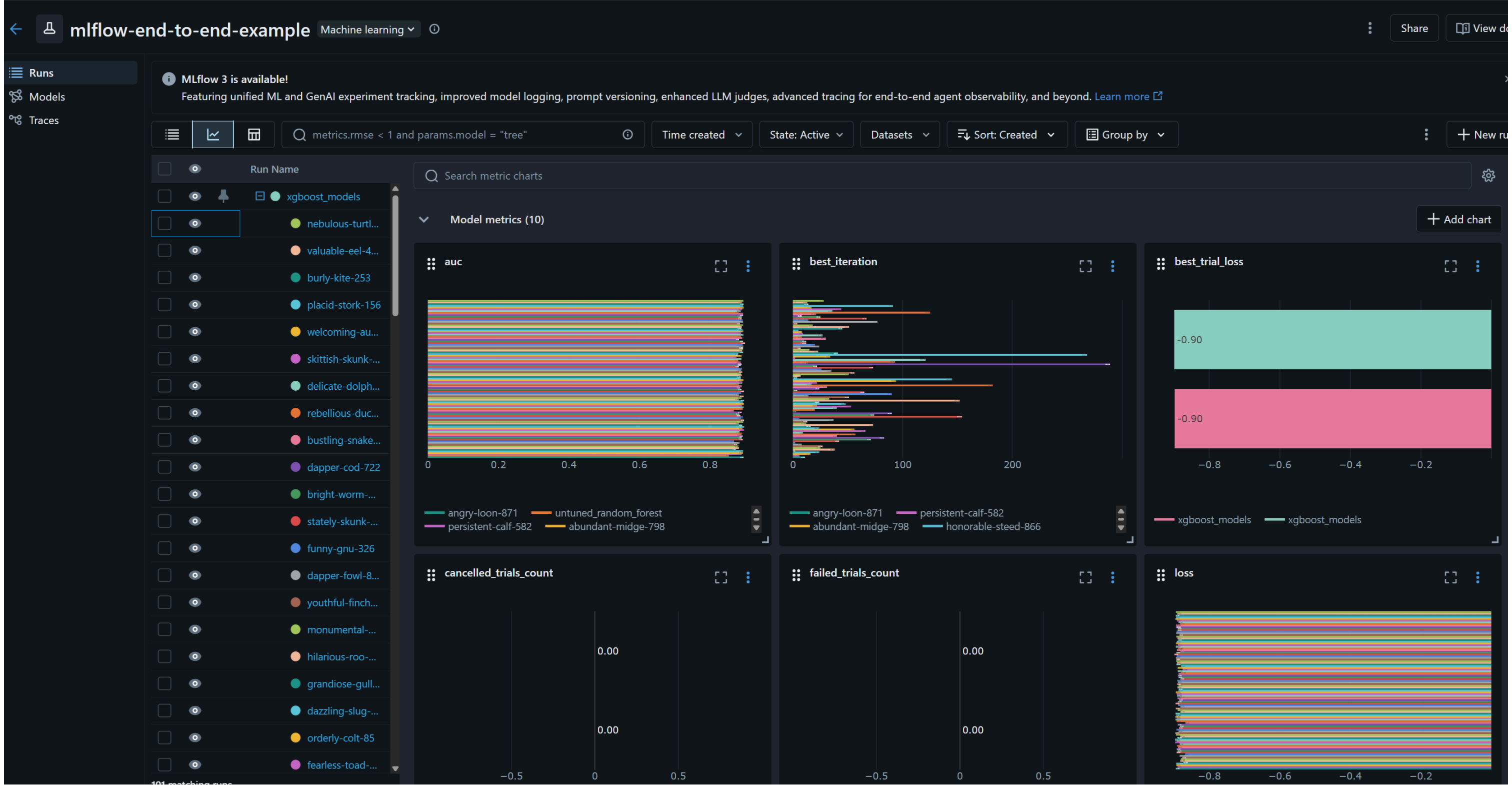
Model available in models tab:



Description
Default schema (auto-created)

Name	Owner	Created at
myregisteredmodel1	ffwsdw@gmail.com	Dec 26, 2025, 01:49 PM
wine_quality	ffwsdw@gmail.com	Dec 26, 2025, 12:53 PM

3. New model xgboost_models experiments:



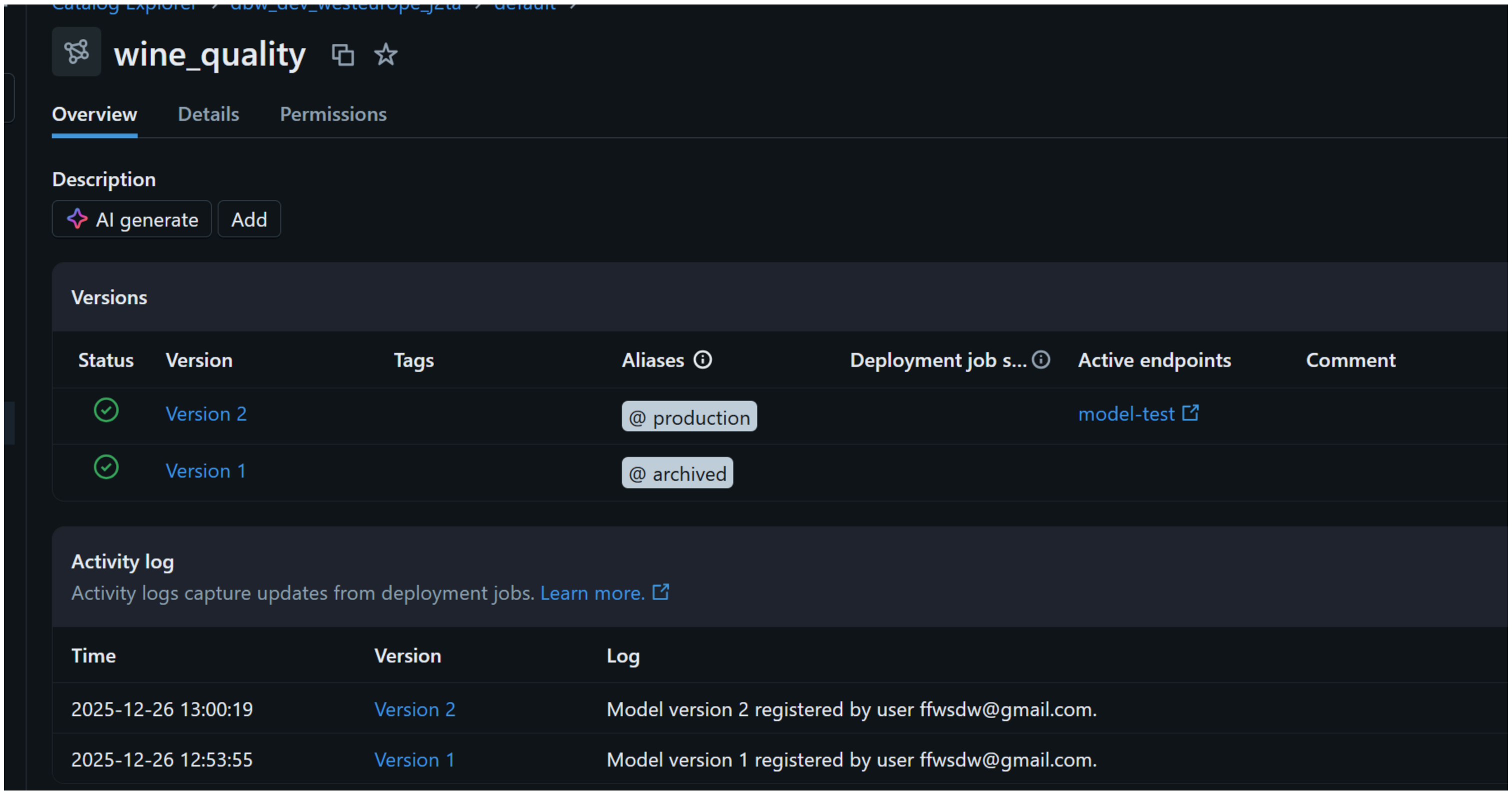
MLflow 3 is available!
Featuring unified ML and GenAI experiment tracking, improved model logging, prompt versioning, enhanced LLM judges, advanced tracing for end-to-end agent observability, and beyond. Learn more

metrics.rmse < 1 and params.model = "tree"

Model metrics (10)

Run Name
xgboost_models
nebulous-turtl...
valuable-eel-4...
burly-kite-253
placid-stork-156
welcoming-au...
skittish-skunk-...
delicate-dolph...
rebellious-duc...
bustling-snake...
dapper-cod-722
bright-worm-...
stately-skunk-...
funny-gnu-326
dapper-fowl-8...
youthful-finch...
monumental-...
hilarious-roo-...
grandiose-gull...
dazzling-slug-...
orderly-colt-85
fearless-toad-...

Version 2 with better results added:



Catalog Explorer > dbw_dev_westeurope_jzta > default >

wine_quality

Overview Details Permissions

Description

AI generate Add

Versions

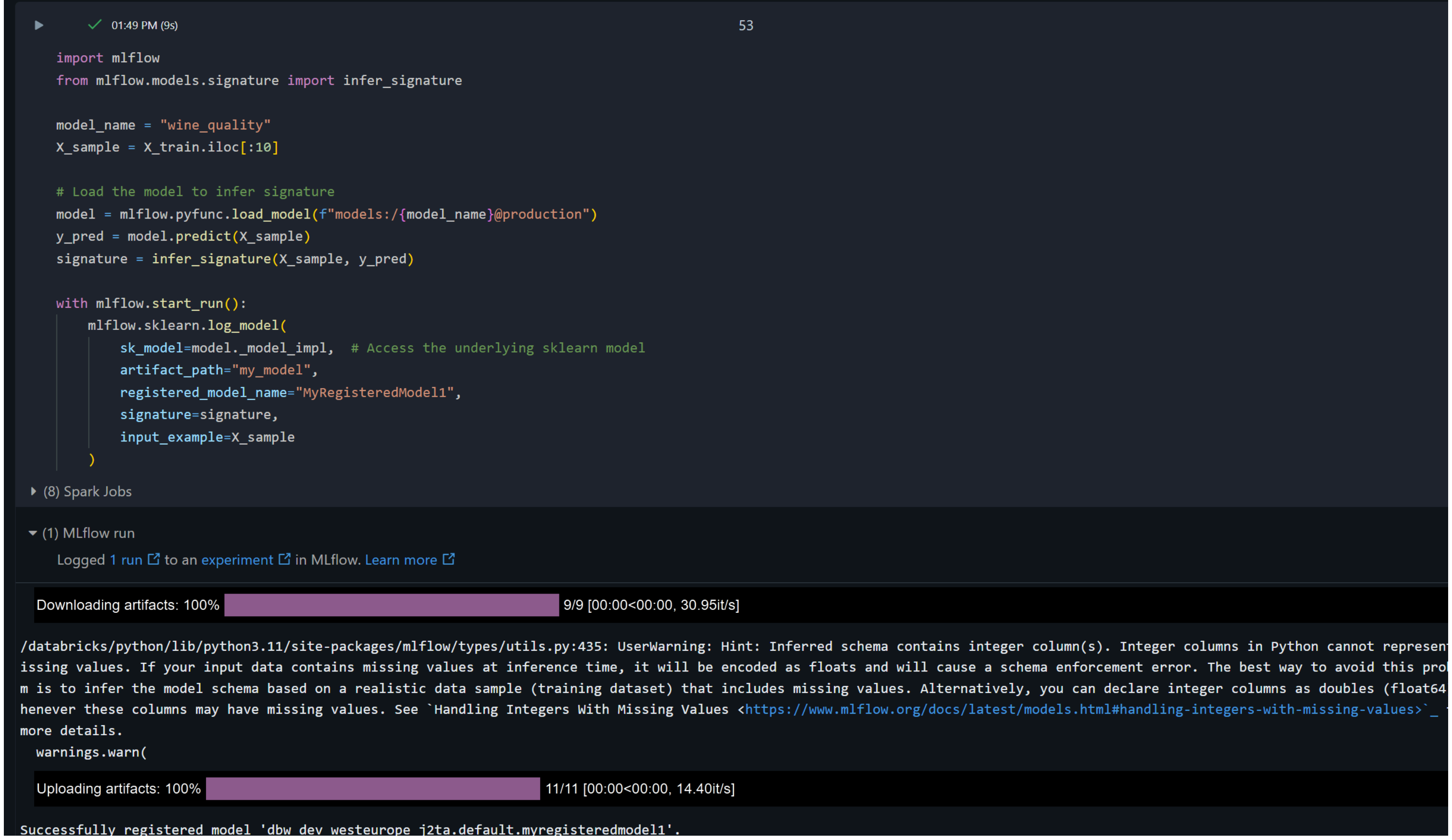
Status	Version	Tags	Aliases	Deployment job s...	Active endpoints	Comment
✓	Version 2		@ production		model-test	
✓	Version 1		@ archived			

Activity log

Activity logs capture updates from deployment jobs. Learn more.

Time	Version	Log
2025-12-26 13:00:19	Version 2	Model version 2 registered by user ffwsdw@gmail.com.
2025-12-26 12:53:55	Version 1	Model version 1 registered by user ffwsdw@gmail.com.

4. Server thee model. I rewrote this cell to successfully log the model:



01:49 PM (9s) 53

```python
import mlflow
from mlflow.models.signature import infer_signature

model_name = "wine_quality"
X_sample = X_train.iloc[:10]

# Load the model to infer signature
model = mlflow.pyfunc.load_model(f"models:/{model_name}@production")
y_pred = model.predict(X_sample)
signature = infer_signature(X_sample, y_pred)

with mlflow.start_run():
    mlflow.sklearn.log_model(
        sk_model=model._model_impl,  # Access the underlying sklearn model
        artifact_path="my_model",
        registered_model_name="MyRegisteredModel1",
        signature=signature,
        input_example=X_sample
    )
```

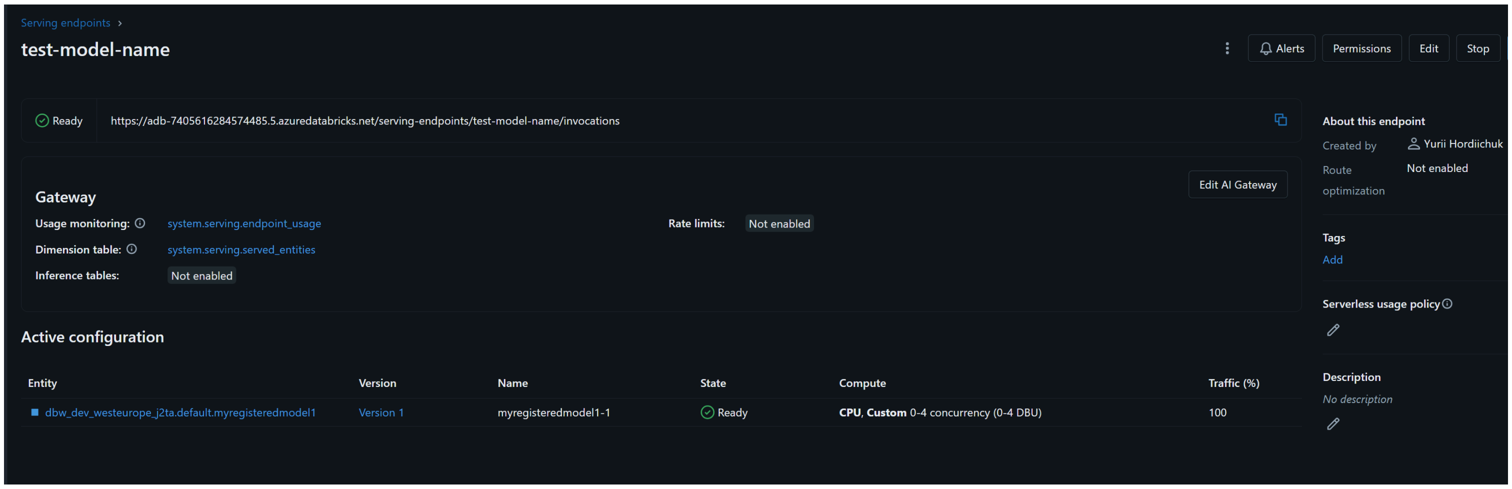
(8) Spark Jobs

(1) MLflow run

Logged 1 run to an experiment in MLflow. Learn more

```
Downloading artifacts: 100%                                     9/9 [00:00<00:00, 30.95it/s]

/databricks/python/lib/python3.11/site-packages/mlflow/types/utils.py:435: UserWarning: Hint: Inferred schema contains integer column(s). Integer columns in Python cannot represen
issing values. If your input data contains missing values at inference time, it will be encoded as floats and will cause a schema enforcement error. The best way to avoid this pro
m is to infer the model schema based on a realistic data sample (training dataset) that includes missing values. Alternatively, you can declare integer columns as doubles (float64
henever these columns may have missing values. See `Handling Integers With Missing Values <https://www.mlflow.org/docs/latest/models.html#handling-integers-with-missing-values>`_ 
more details.
  warnings.warn(

Uploading artifacts: 100%                                     11/11 [00:00<00:00, 14.40it/s]

Successfully registered model 'dbw_dev_westeurope_j2ta.default.myregisteredmodel1'.
```

I created a served endpoint. Access token and model URL obtained:



Serving endpoints ›

test-model-name

Ready https://adb-7405616284574485.5.azuredatabricks.net/serving-endpoints/test-model-name/invocations

Gateway

Usage monitoring:	system.serving.endpoint_usage
Dimension table:	system.serving.served_entities
Inference tables:	Not enabled
Rate limits:	Not enabled

Active configuration

Entity	Version	Name	State	Compute	Traffic (%)
dbw_dev_westeurope_j2ta.default.myregisteredmodel1	Version 1	myregisteredmodel1-1	Ready	**CPU**, **Custom** 0-4 concurrency (0-4 DBU)	100

About this endpoint

Created by	Yurii Hordiichuk
Route optimization	Not enabled

Tags

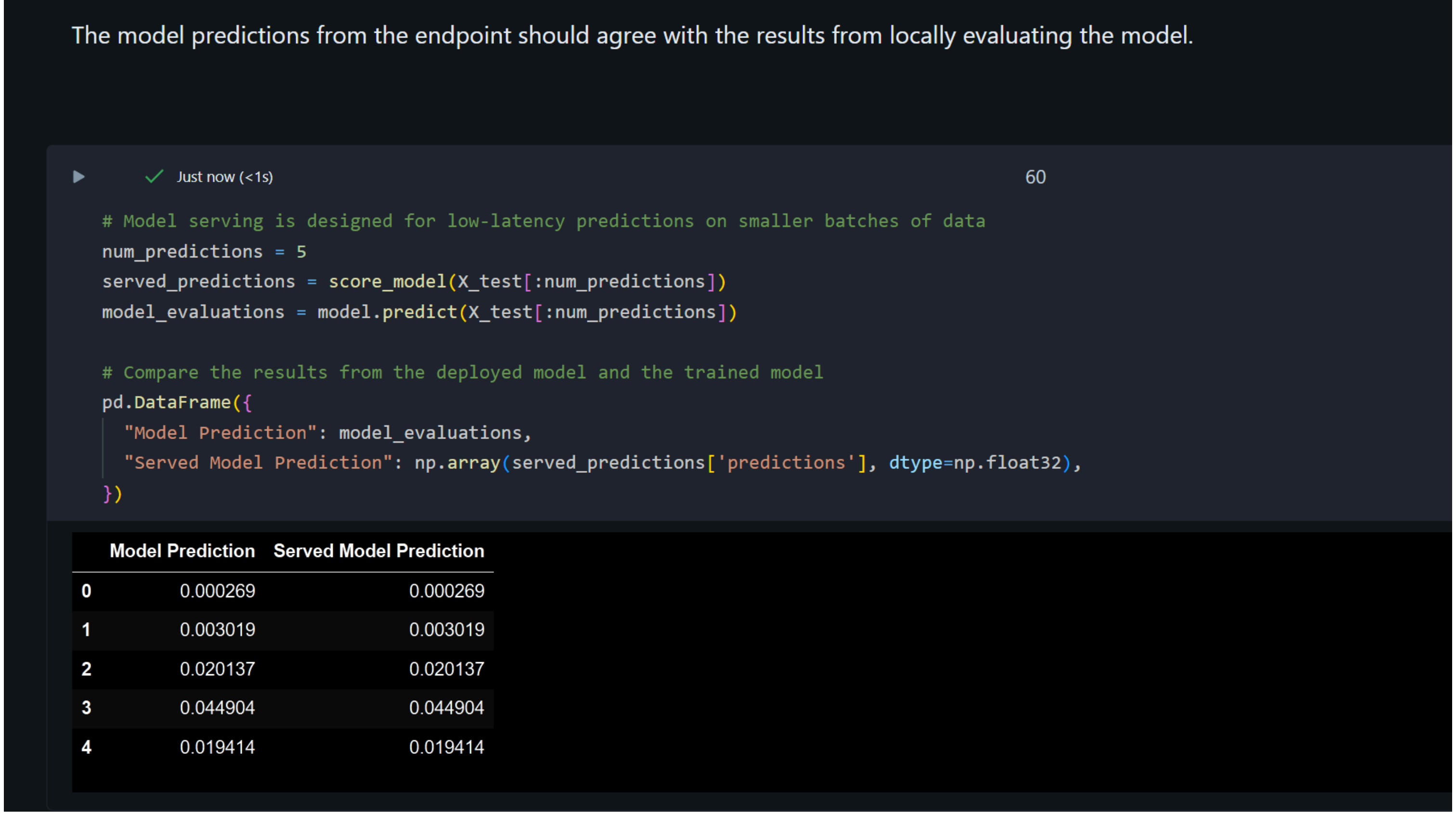
Add

Serverless usage policy

Description

No description

5. The model prediction from the endpoint agree with the result from local model:



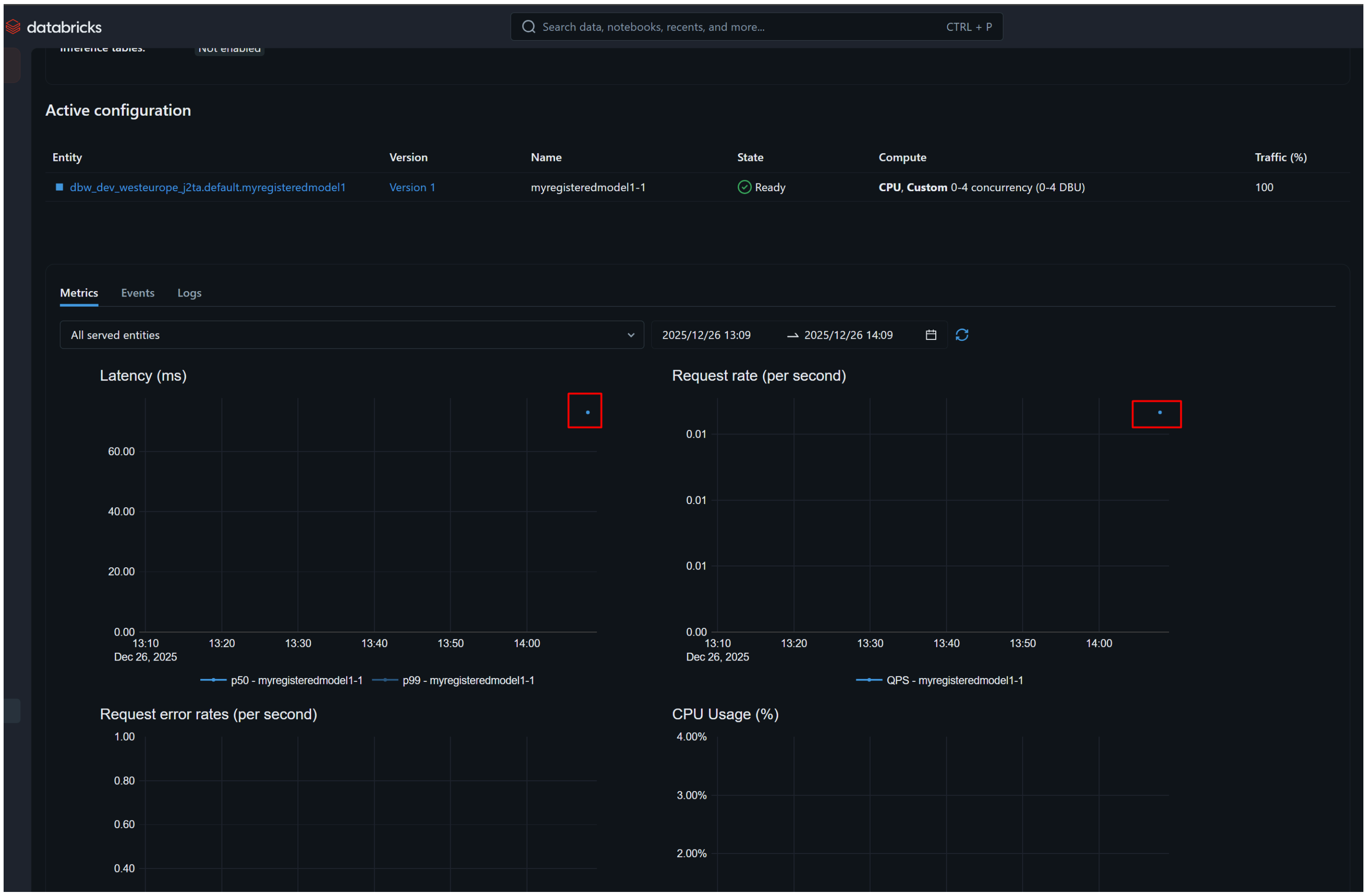
The model predictions from the endpoint should agree with the results from locally evaluating the model.

Just now (<1s) 60

```python
# Model serving is designed for low-latency predictions on smaller batches of data
num_predictions = 5
served_predictions = score_model(X_test[:num_predictions])
model_evaluations = model.predict(X_test[:num_predictions])

# Compare the results from the deployed model and the trained model
pd.DataFrame({
  "Model Prediction": model_evaluations,
  "Served Model Prediction": np.array(served_predictions['predictions'], dtype=np.float32),
})
```

	Model Prediction	Served Model Prediction
0	0.000269	0.000269
1	0.003019	0.003019
2	0.020137	0.020137
3	0.044904	0.044904
4	0.019414	0.019414

Request appeared on the chart:



databricks
Search data, notebooks, recents, and more...
CTRL + P
Inference tables: Not enabled

Active configuration

Entity	Version	Name	State	Compute	Traffic (%)
dbw_dev_westeurope_j2ta.default.myregisteredmodel1	Version 1	myregisteredmodel1-1	Ready	**CPU**, **Custom** 0-4 concurrency (0-4 DBU)	100