Azure Databrics

Agenda

What is Azure Databricks?

Create Workspace and Cluster

Working with Notebooks and Jobs

Libraries Overview

Administration, Manage Users & Groups

What is Azure Databricks?

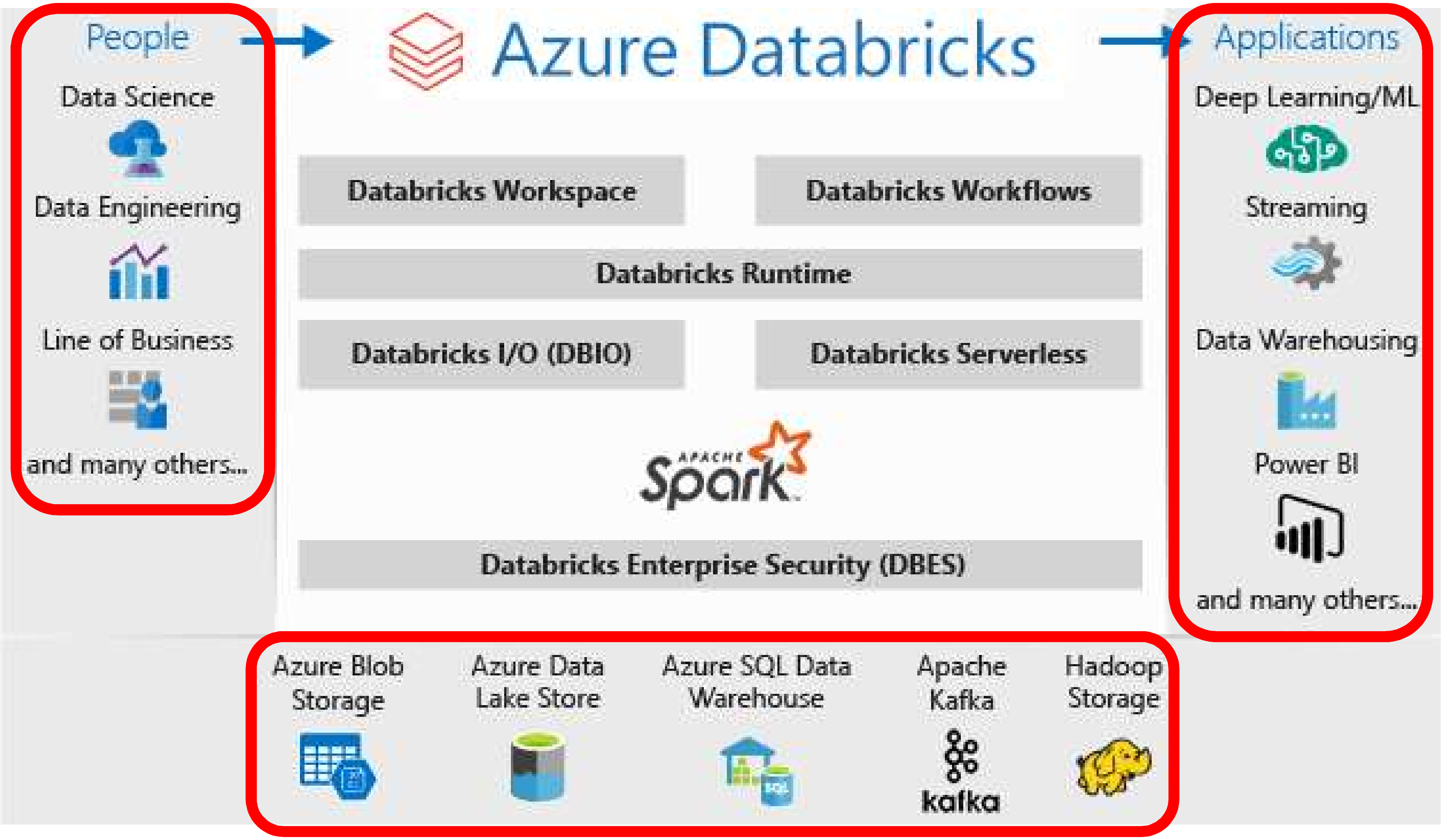
Apache Spark-based

Analytics platform

Provides

- One-click setup
- Streamlined workflows and
- An interactive workspace
- Enables collaboration between data scientists, data engineers, and business analysts.

Azure Databricks



People

Data Science

Data Engineering

Line of Business

and many others...

Azure Databricks

Databricks Workspace

Databricks Workflows

Databricks Runtime

Databricks I/O (DBIO)

Databricks Serverless

APACHE Spark

Databricks Enterprise Security (DBES)

Applications

Deep Learning/ML

Streaming

Data Warehousing

Power BI

and many others...

Azure Blob Storage

Azure Data Lake Store

Azure SQL Data Warehouse

Apache Kafka

kafka

Hadoop Storage

Azure Databricks

For a big data pipeline, the data is ingested into Azure

This data lands in

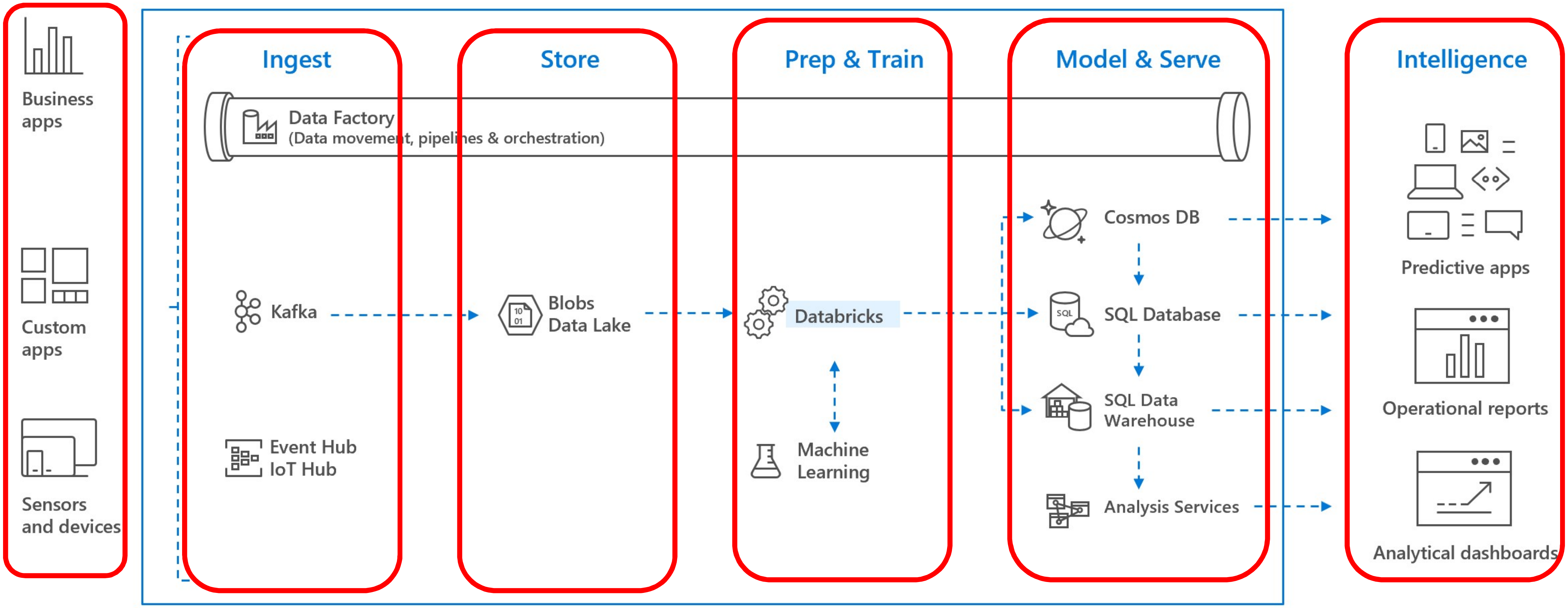
- Azure Blob Storage or
- Azure Data Lake Storage

Use Azure Databricks to read data from multiple data sources

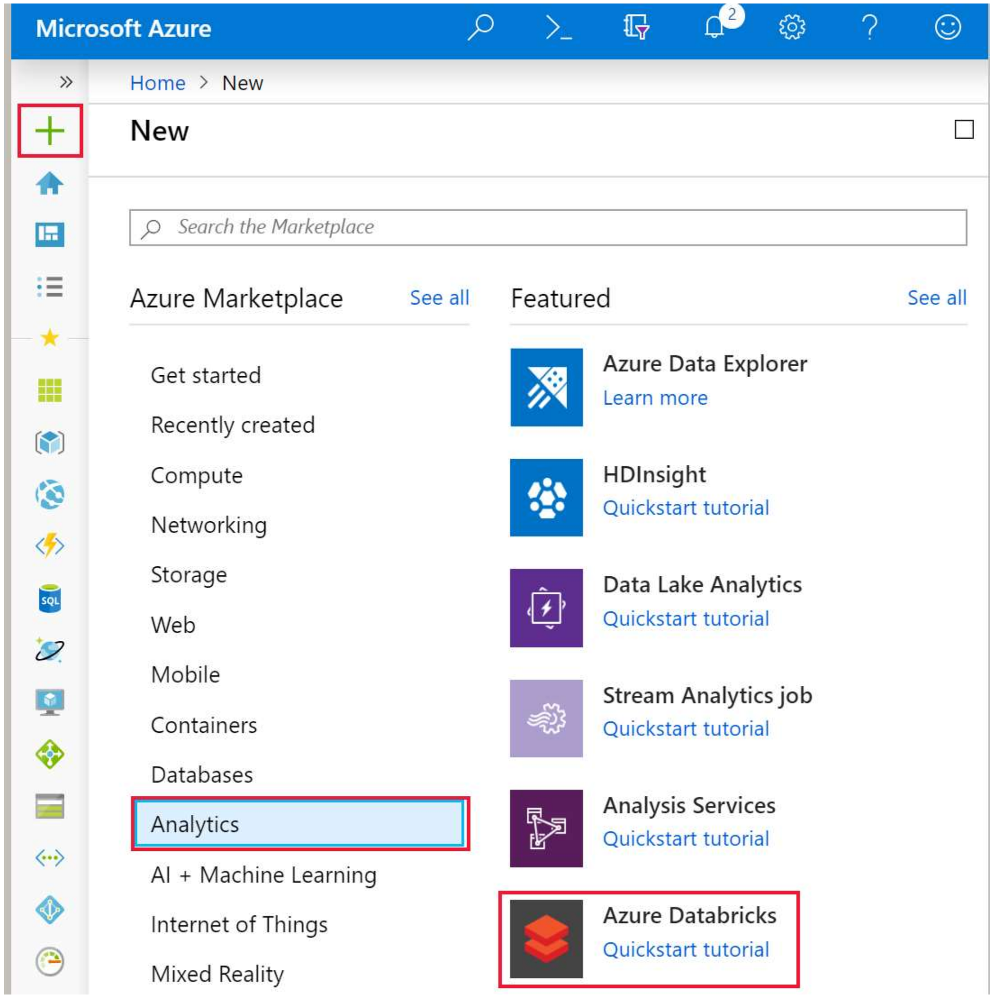
- Azure Blob Storage
- Azure Data Lake Storage
- Azure Cosmos DB, or
- Azure SQL Data Warehouse

Using Databricks, turn it into breakthrough insights

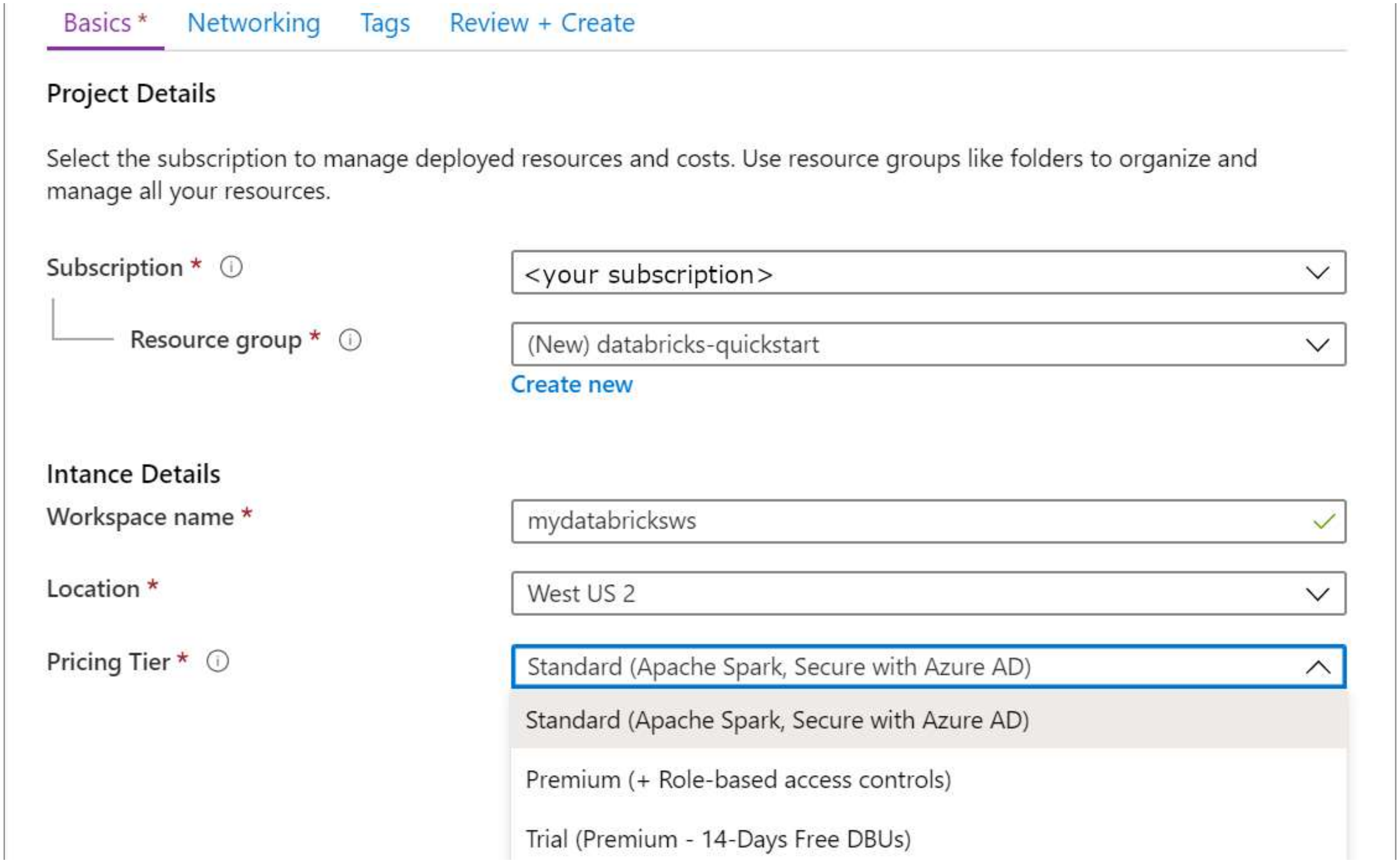
Azure Databricks



Hands-On: Create Databricks Workspace



Hands-On: Create Databricks Workspace



Project Details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * <your subscription>

Resource group * : (New) databricks-quickstart

Intance Details

Workspace name * : mydatabricksws

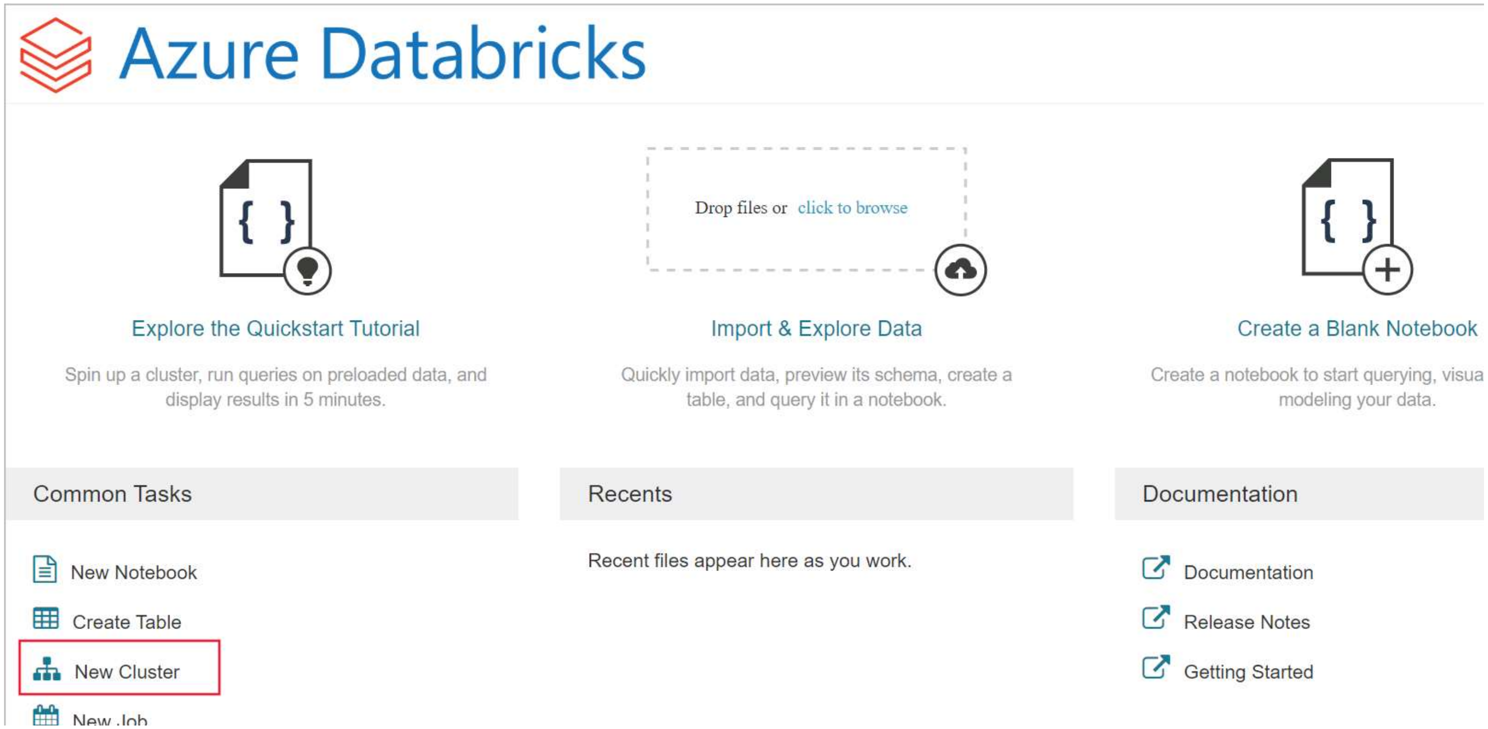
Location * : West US 2

Pricing Tier * : Standard (Apache Spark, Secure with Azure AD)

- Standard (Apache Spark, Secure with Azure AD)
- Premium (+ Role-based access controls)
- Trial (Premium - 14-Days Free DBUs)

Hands-On: Create a Spark cluster in Databricks

- Go to the Databricks workspace that you created, and then click Launch Workspace.
- You are redirected to the Azure Databricks portal.
- Click New Cluster



Spin up a cluster, run queries on preloaded data, and display results in 5 minutes.

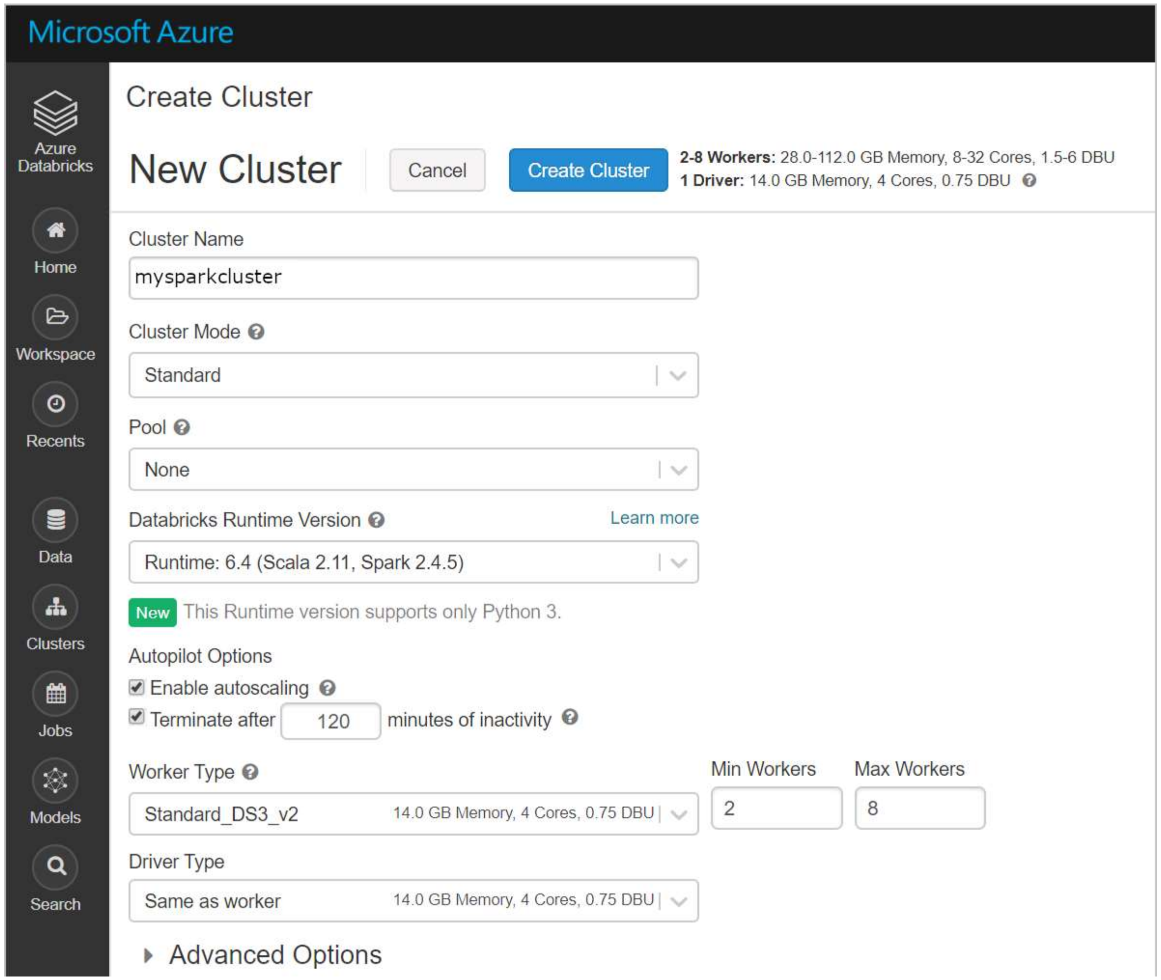
Quickly import data, preview its schema, create a table, and query it in a notebook.

Create a notebook to start querying, visua modeling your data.

Recent files appear here as you work.

Hands-On: Create a Spark cluster in Databricks

- Make sure you select the Terminate after __ minutes of inactivity checkbox
- Provide a duration (in minutes) to terminate the cluster, if the cluster is not being used.



Create Cluster

New Cluster

2-8 Workers: 28.0-112.0 GB Memory, 8-32 Cores, 1.5-6 DBU
1 Driver: 14.0 GB Memory, 4 Cores, 0.75 DBU

Cluster Name: mysparkcluster

Cluster Mode: Standard

Pool: None

Databricks Runtime Version: Runtime: 6.4 (Scala 2.11, Spark 2.4.5)

This Runtime version supports only Python 3.

Autopilot Options

☑ Enable autoscaling

☑ Terminate after 120 minutes of inactivity

Worker Type: Standard_DS3_v2 14.0 GB Memory, 4 Cores, 0.75 DBU

Min Workers: 2

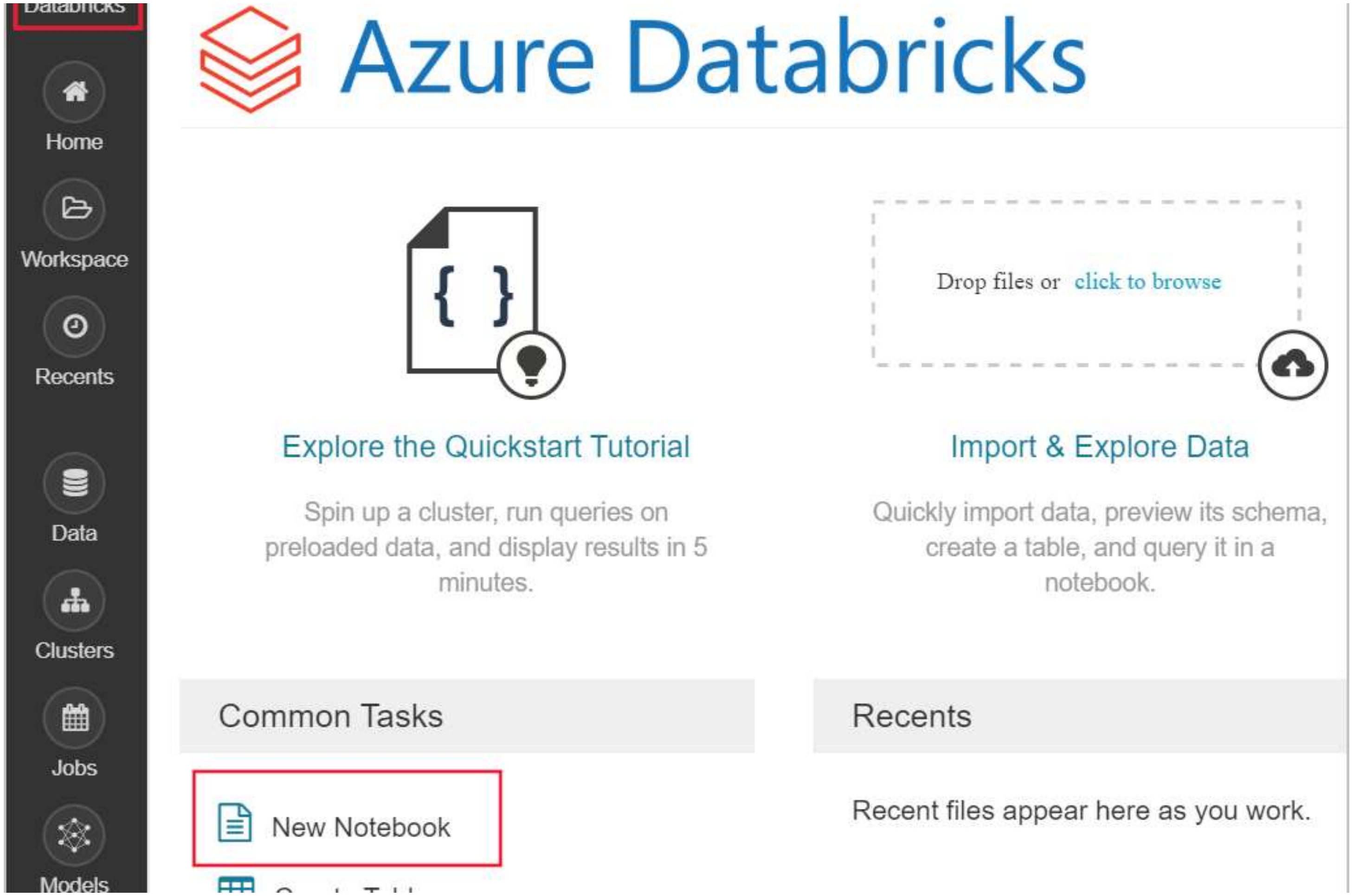
Max Workers: 8

Driver Type: Same as worker 14.0 GB Memory, 4 Cores, 0.75 DBU

Run a Spark SQL job

Hands-On: Run a Spark SQL job

Source Code:
atinNotebook1.ipynb



Spin up a cluster, run queries on preloaded data, and display results in 5 minutes.

Quickly import data, preview its schema, create a table, and query it in a notebook.

Recent files appear here as you work.

Hands-On: Run a Spark SQL job

- The following command sets the Azure storage access information.
  - blob_account_name = "azureopendatastorage"
  - blob_container_name = "citydatacontainer"
  - blob_relative_path = "Safety/Release/city=Boston"
  - blob_sas_token = r"?st=2019-02-26T02%3A34%3A32Z&se=2119-02-27T02%3A34%3A00Z&sp=rl&sv=2018-03-28&sr=c&sig=XlJVWA7fMXCSxCKqJm8psMOh0W4h7cSYO28coRqF2fs%3D"

Hands-On: Run a Spark SQL job

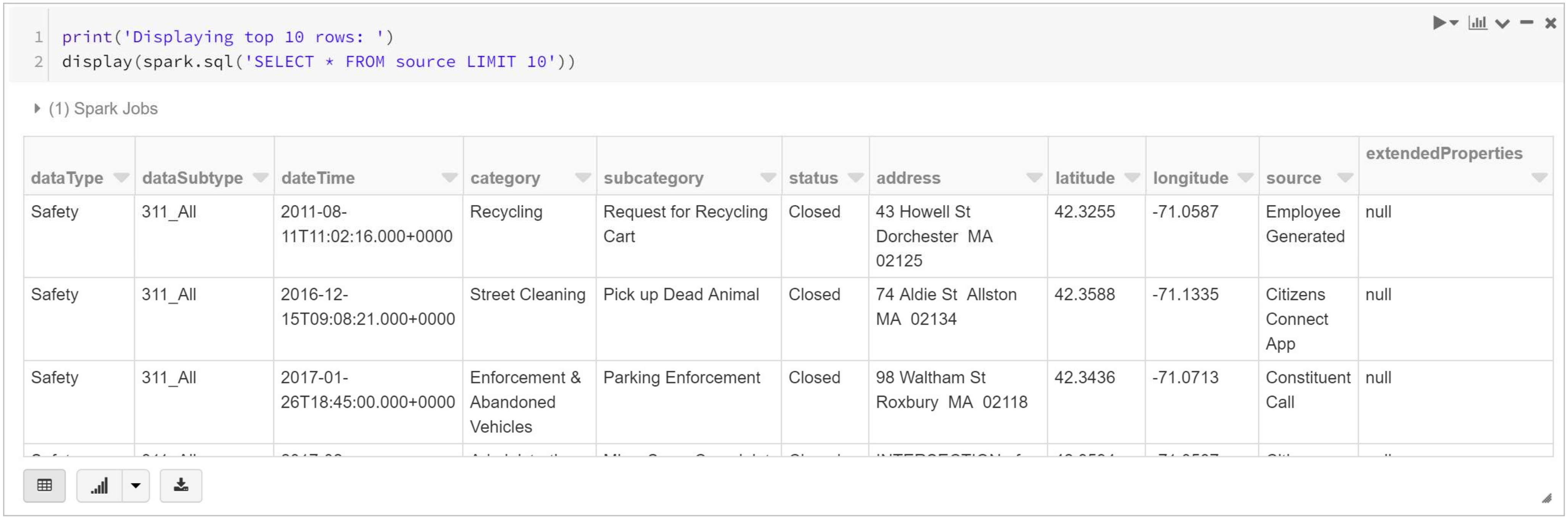
- The following command allows Spark to read from Blob storage remotely
  - wasbs_path = 'wasbs://%s@%s.blob.core.windows.net/%s' % (blob_container_name, blob_account_name, blob_relative_path)
  - spark.conf.set('fs.azure.sas.%s.%s.blob.core.windows.net' % (blob_container_name, blob_account_name), blob_sas_token)
  - print('Remote blob path: ' + wasbs_path)

Hands-On: Run a Spark SQL job

- The following command creates a DataFrame
  - df = spark.read.parquet(wasbs_path)
  - print('Register the DataFrame as a SQL temporary view: source')
  - df.createOrReplaceTempView('source')

Hands-On: Run a Spark SQL job

- Run a SQL statement return the top 10 rows of data
  - print('Displaying top 10 rows: ')
  - display(spark.sql('SELECT * FROM source LIMIT 10'))

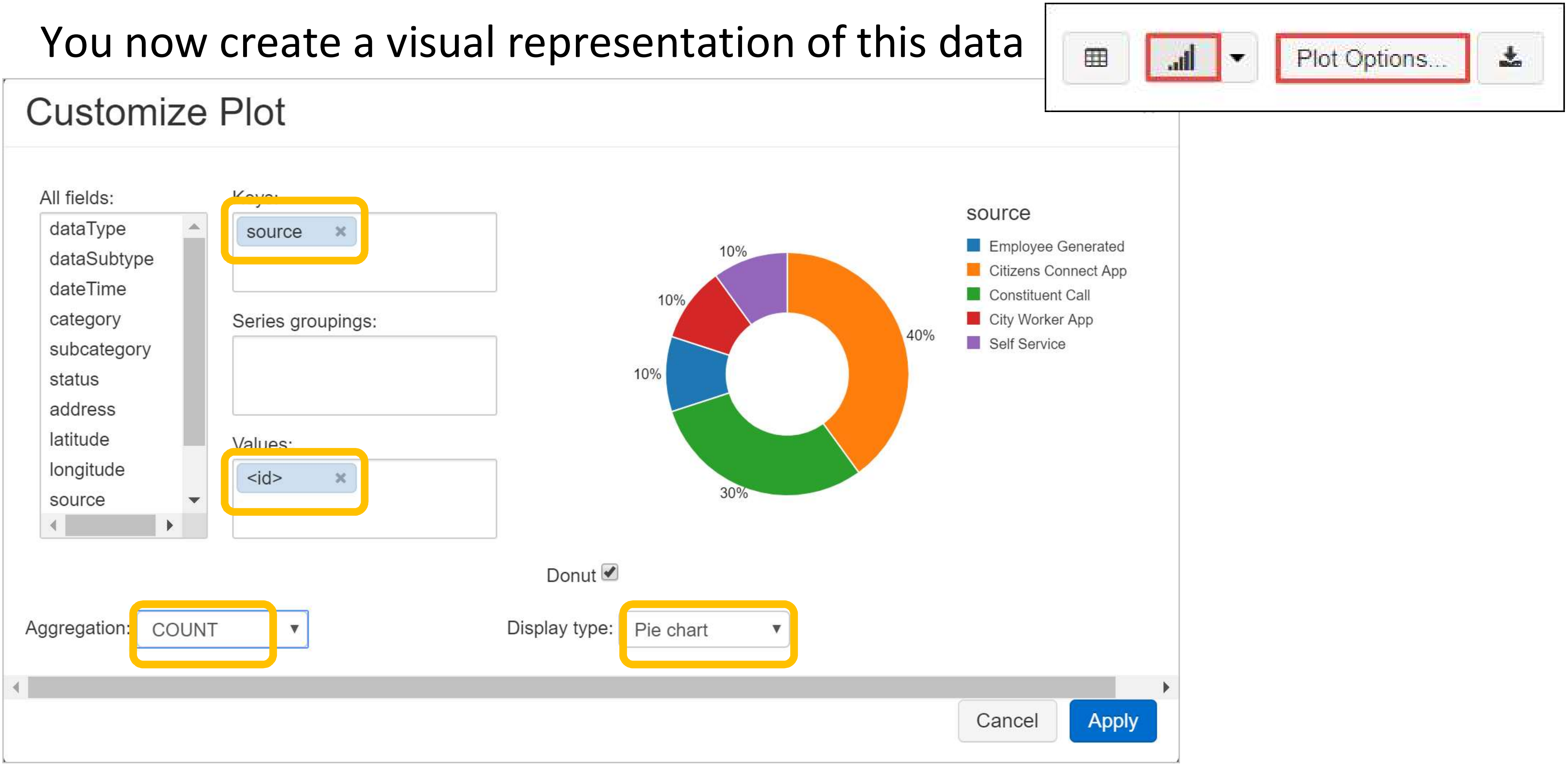


```
print('Displaying top 10 rows: ')
display(spark.sql('SELECT * FROM source LIMIT 10'))
```

dataType	dataSubtype	dateTime	category	subcategory	status	address	latitude	longitude	source	extendedProperties
Safety	311_All	2011-08-11T11:02:16.000+0000	Recycling	Request for Recycling Cart	Closed	43 Howell St Dorchester MA 02125	42.3255	-71.0587	Employee Generated	null
Safety	311_All	2016-12-15T09:08:21.000+0000	Street Cleaning	Pick up Dead Animal	Closed	74 Aldie St Allston MA 02134	42.3588	-71.1335	Citizens Connect App	null
Safety	311_All	2017-01-26T18:45:00.000+0000	Enforcement & Abandoned Vehicles	Parking Enforcement	Closed	98 Waltham St Roxbury MA 02118	42.3436	-71.0713	Constituent Call	null

Hands-On: Run a Spark SQL job

- You now create a visual representation of this data



Customize Plot

Keys: source

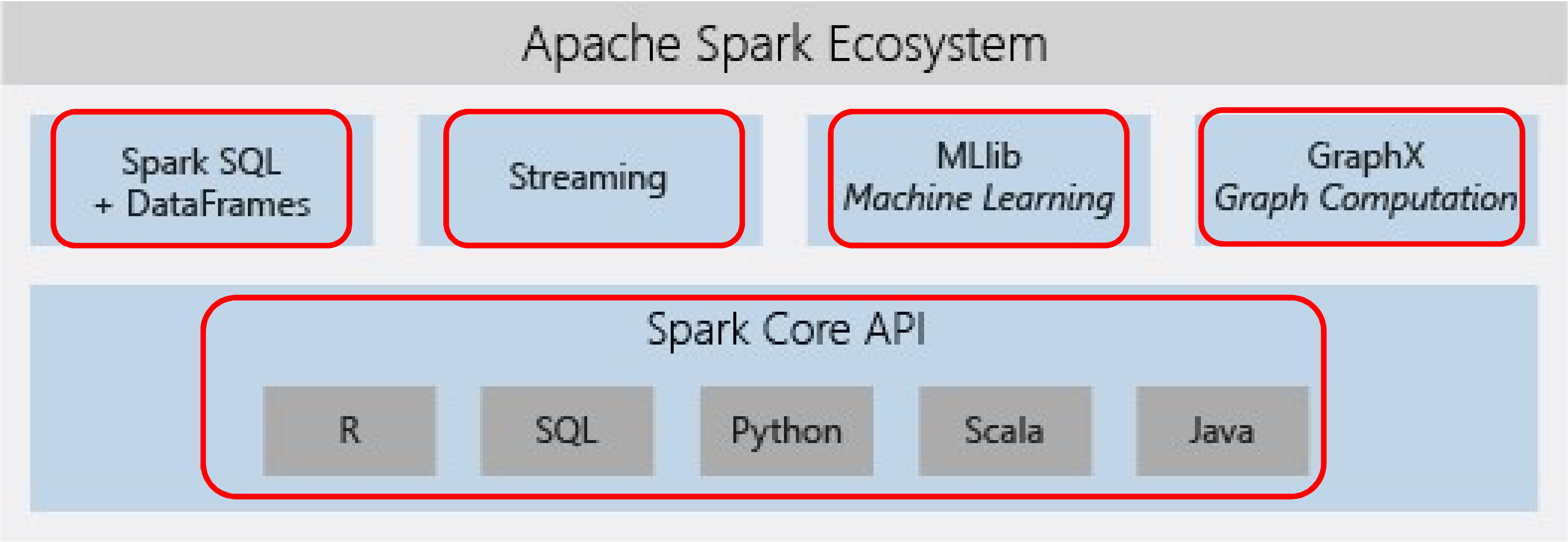
Values: <id>

Donut ☑

Aggregation: COUNT

Display type: Pie chart

Apache Spark-based analytics platform



Azure Databricks concepts

Azure Databricks concepts

Workspace

- Environment for accessing all of your Azure Databricks assets.
- Organizes objects into folders

Objects

- Notebooks
- Libraries
- Dashboards
- Experiments

Notebook

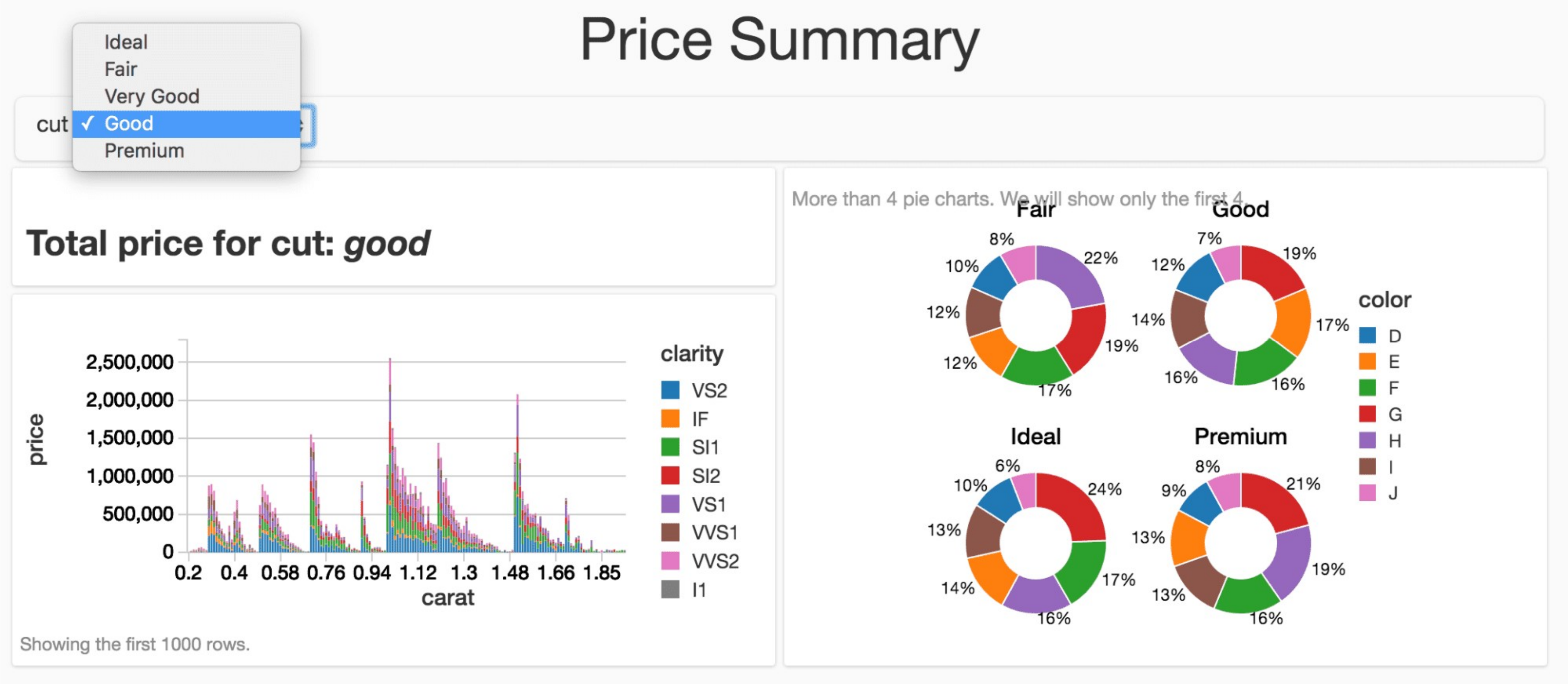
A web-based interface for documents

Document contain

- Runnable commands
- Visualizations, and
- Narrative text.

Dashboard

- Provides access to visualizations



Price Summary

cut: ✓ Good

Total price for cut: *good*

Showing the first 1000 rows.

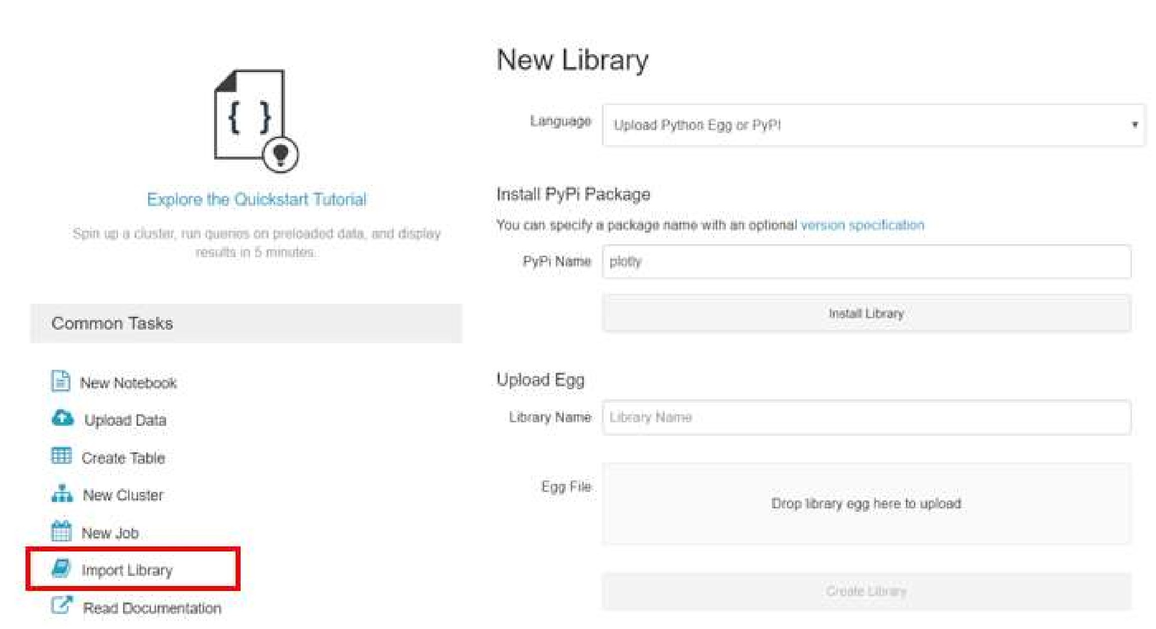
More than 4 pie charts. We will show only the first 4.

Library

A package of code available to the notebook

Databricks runtimes include many libraries

You can add your own.



Explore the Quickstart Tutorial

Spin up a cluster, run queries on preloaded data, and display results in 5 minutes.

Common Tasks

- New Notebook
- Upload Data
- Create Table
- New Cluster
- New Job
- Import Library
- Read Documentation

New Library

Language: Upload Python Egg or PyPI

Install PyPi Package

You can specify a package name with an optional version specification

PyPi Name: plotly

Install Library

Upload Egg

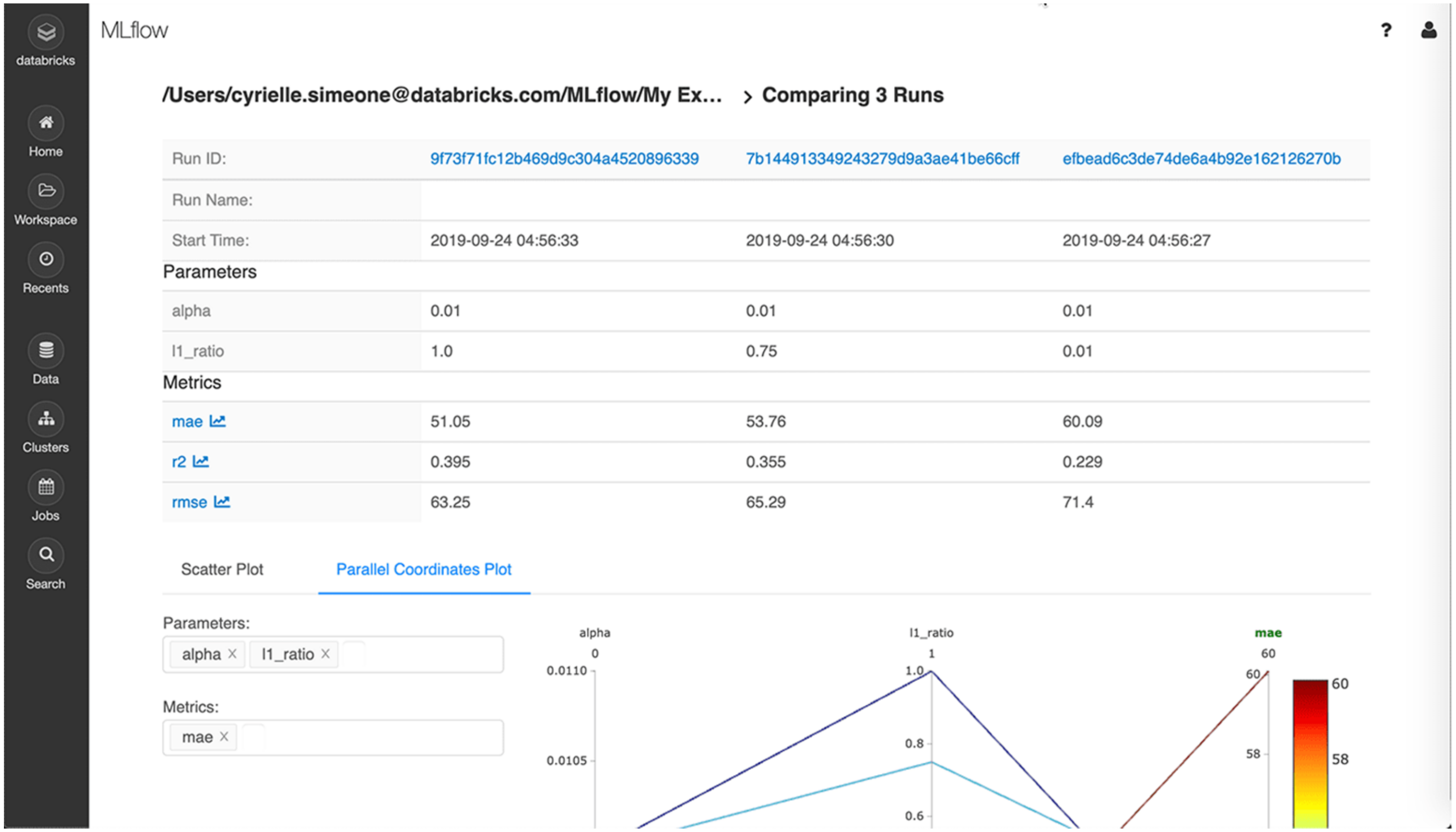
Library Name: Library Name

Egg File: Drop library egg here to upload

Create Library

Experiment

- A collection of MLflow runs for training a machine learning model.



/Users/cyrielle.simeone@databricks.com/MLflow/My Ex... › Comparing 3 Runs

Run ID:	9f73f71fc12b469d9c304a4520896339	7b144913349243279d9a3ae41be66cff	efbead6c3de74de6a4b92e162126270b
Run Name:			
Start Time:	2019-09-24 04:56:33	2019-09-24 04:56:30	2019-09-24 04:56:27
Parameters			
alpha	0.01	0.01	0.01
l1_ratio	1.0	0.75	0.01
Metrics			
mae	51.05	53.76	60.09
r2	0.395	0.355	0.229
rmse	63.25	65.29	71.4

Parameters: alpha × l1_ratio ×

Metrics: mae ×

Authentication and authorization

User

- A unique individual who has access to the system.

Group

- A collection of users.

Access control list (ACL)

- A list of permissions attached to the objects.
- Specifies which users or system processes are granted access to the objects

Authentication

user name
******
LOGIN

Who are you?

Validate a system is accessing by the right person

Authorization

Are you allowed to do that?

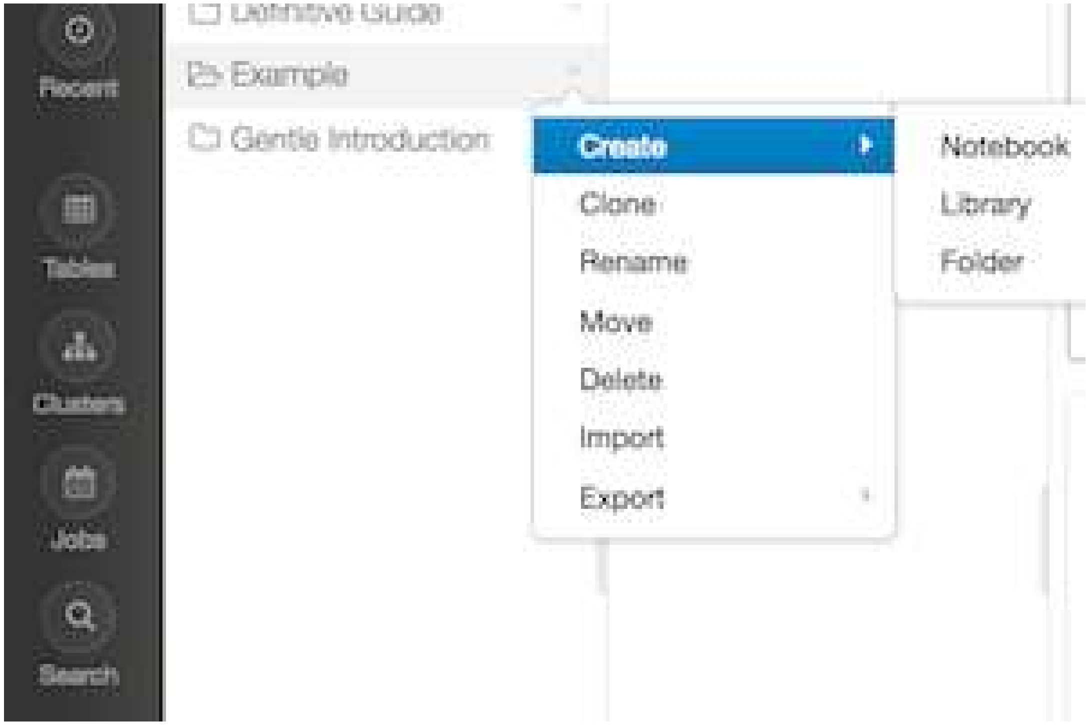
Check users' permissions to access data

Work with Notebooks

What is Notebook?

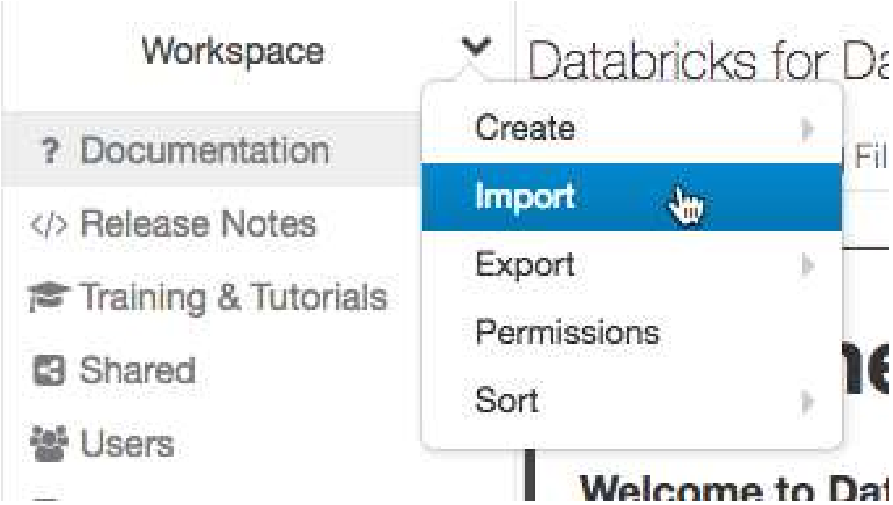
- A web-based interface to a document that contains
  - Runnable code
  - Visualizations, and
  - Narrative text

Hands-On: Create a notebook



Hands-On

- Open a Notebook
- Delete a Notebook
- Rename a notebook
- Import a notebook
- Export a notebook



Hands-On: Notebooks and clusters

- Before you can do any work in a notebook, you must first attach the notebook to a cluster
- Attach a notebook to a cluster
- Detach a notebook from a cluster
- View all notebooks attached to a cluster
- Schedule a notebook

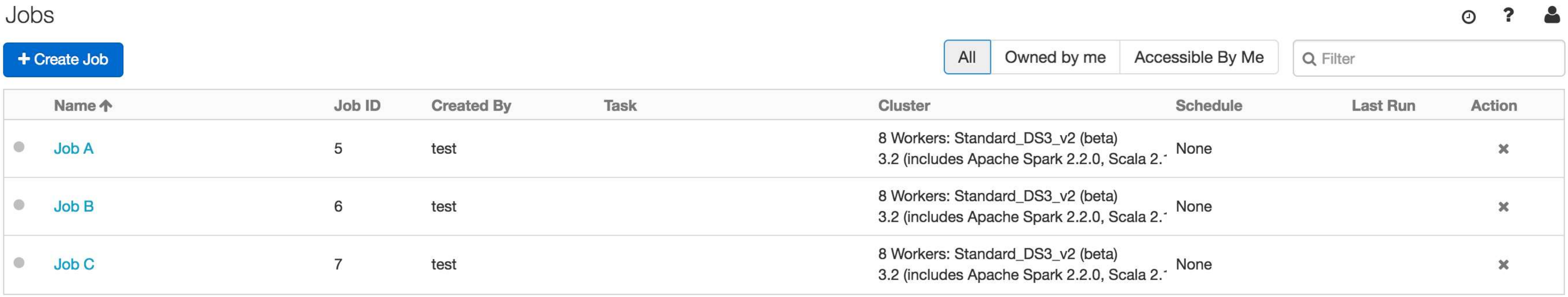
Work with Jobs

What is a Job?

- A way of running a notebook on a scheduled basis
- Can create and run jobs using the
  - UI
  - CLI
  - By invoking the Jobs API

View jobs

- Click the Jobs icon Jobs Menu Icon in the sidebar



	Name ↑	Job ID	Created By	Task	Cluster	Schedule	Last Run	Action
●	Job A	5	test		8 Workers: Standard_DS3_v2 (beta) 3.2 (includes Apache Spark 2.2.0, Scala 2.1	None		✖
●	Job B	6	test		8 Workers: Standard_DS3_v2 (beta) 3.2 (includes Apache Spark 2.2.0, Scala 2.1	None		✖
●	Job C	7	test		8 Workers: Standard_DS3_v2 (beta) 3.2 (includes Apache Spark 2.2.0, Scala 2.1	None		✖

Hands-On: Create a job

Hands-On: Run a job

- Schedule a job
- Pause and resume a job schedule
- Run a job immediately

Hands-On: View job run details

Library dependencies

- To get the full list of the driver library dependencies, run the following command inside a notebook
  - %sh
  - ls /databricks/jars

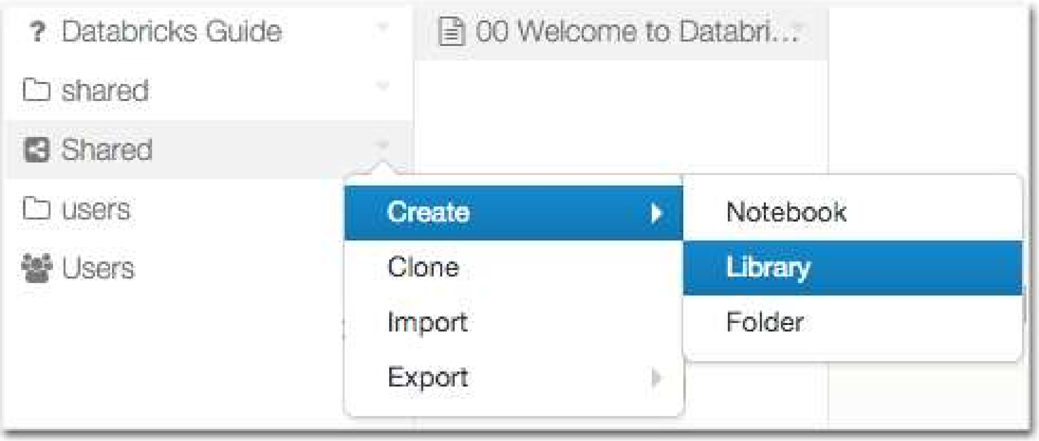
Libraries Overview

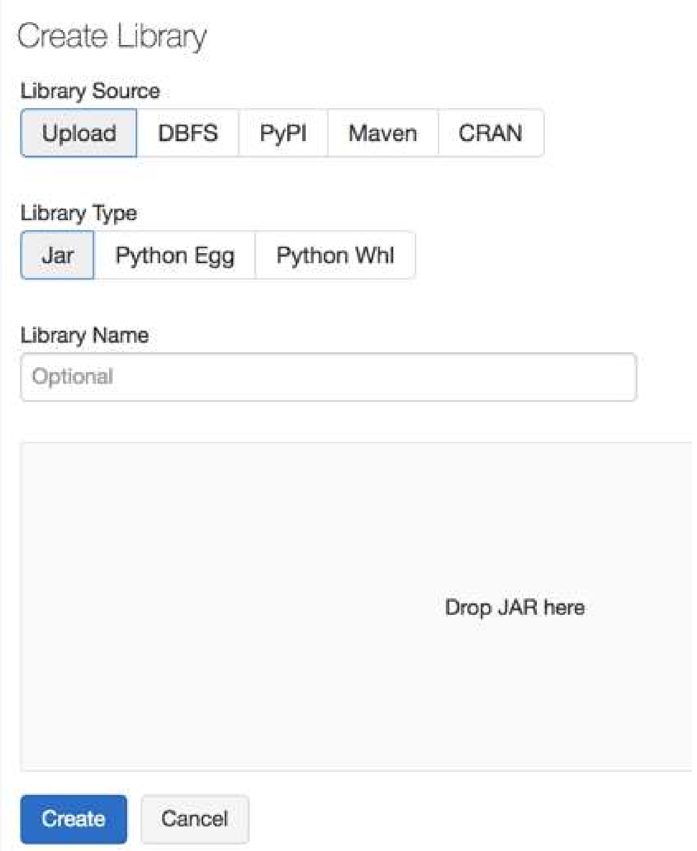
Libraries Overview

- To make third-party or custom code available to notebooks and jobs running on your clusters, you can install a library.
- Libraries can be installed using:
  - Workspace libraries
    - Serve as a local repository from which you create cluster-installed libraries
  - Cluster libraries
    - Can be used by all notebooks running on a cluster
    - Can install a cluster library directly from a public repository such as PyPI
  - Notebook-scoped Python libraries
    - Allow to install Python libraries and create an environment scoped to a notebook session
    - These libraries do not persist and must be re-installed for each session.

Hands-On: Create a workspace library

- Right-click the workspace folder where you want to store the library.
- Select Create > Library.




Create Library

Library Source: Upload | DBFS | PyPI | Maven | CRAN

Library Type: Jar | Python Egg | Python Whl

Library Name: Optional

Drop JAR here

Hands-On: Install a library on a cluster

- Two ways to install a library on a cluster:
  - Install a workspace library that has been already been uploaded to the workspace.
  - Install a library for use with a specific cluster only

Thanks