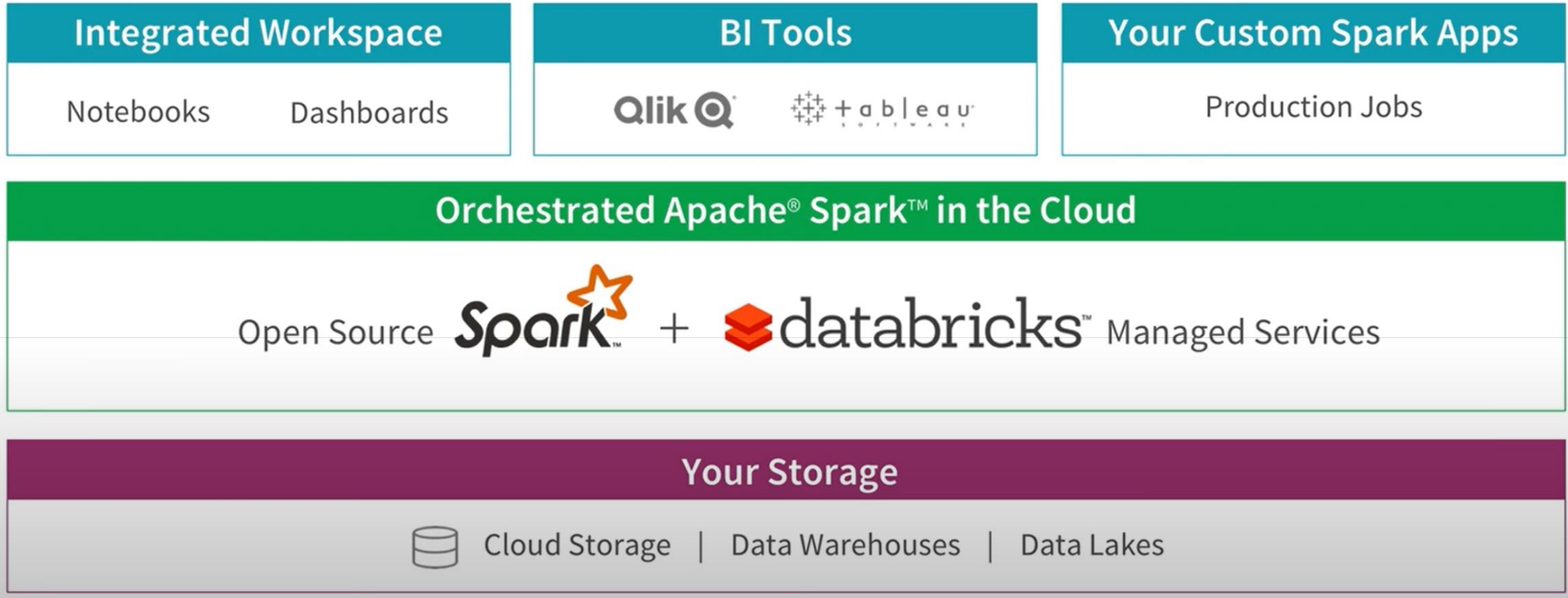
Big Data Tools and Techniques

Chapter 7: Introduction to Spark (Part C)

Introduction to Databricks



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community.cloud.databricks.com/login.html

Important Notice: Acceptable use and unused account termination policy and Terms of Use update.

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Community Edition

Email / Username

Password

Forgot Password?

Sign In

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ENG

2:55 PM
6/6/2020

Try Databricks

An open and unified data analytics platform for data engineering, machine learning, and analytics

From the original creators of Apache Spark™, Delta Lake, MLflow, and Koalas

Tell us a little about yourself to get started.

* First Name:

* Last Name:

* Company Name

* Work Email

* How would you describe your role?

Select...

* What is your intended use case?

Select...

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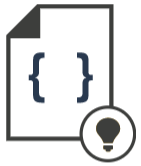
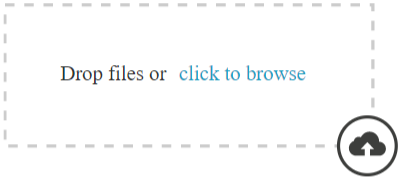
Welcome to databricks



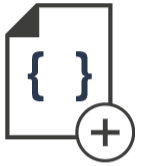
Explore the Quickstart Tutorial

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



Import & Explore Data

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



Create a Blank Notebook

Create a notebook to start querying, visualizing, and modeling your data.

Common Tasks

- New Notebook
- Create Table
- New Cluster
- New Job
- New MLflow Experiment
- Import Library
- Read Documentation

Recents

- Quickstart Notebook

What's new in v3.21

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

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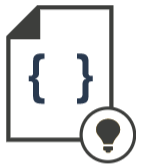


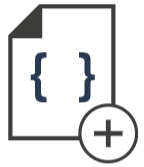
xplore the Quickstart Tutorial

ter, run queries on preloaded data, and display results in 5 minutes.

Drop files or click to browse

Import & Explore Data

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



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My First Notebook

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Create Cluster - Databricks Comm

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Create Cluster

New Cluster

Cancel | Create Cluster

0 Workers: 0.0 GB Memory, 0 Cores, 0 DBU
1 Driver: 15.3 GB Memory, 2 Cores, 1 DBU

Cluster Name

My First Spark Cluster

UI | JSON

Databricks Runtime Version

Runtime: 6.5 (Scala 2.11, Spark 2.4.5)

New This Runtime version supports only Python 3.

Instance

Free 15GB Memory: As a Community Edition user, your cluster will automatically terminate after an idle period of two hours.
For more configuration options, please upgrade your Databricks subscription.

Instances | Spark

Availability Zone

us-west-2c

Search for anything

ENG 3:13 PM 6/6/2020

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Clusters

+ Create Cluster

All | Created by me

Filter

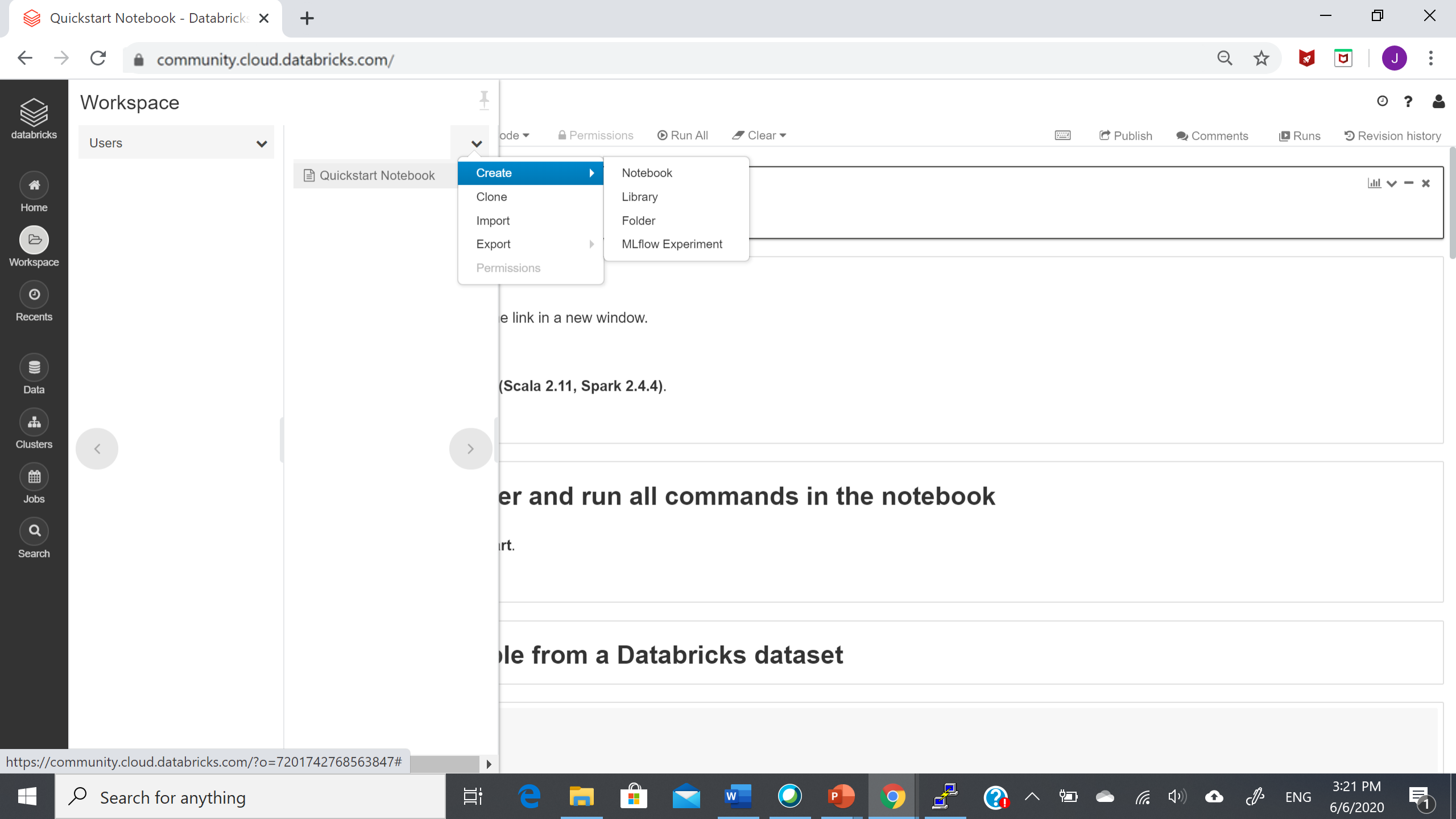
All-Purpose Clusters

1 clusters, 0 pinned

Name	State	Nodes	Driver	Worker	Runtime	Creator		Actions
My First Spark Cluster	Pending	0	Community Optimize	Community Optimize	6.5 (includes Apache ..		0	...

Job Clusters

No clusters found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(Scala 2.11, Spark 2.4.4).
er and run all commands in the notebook
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https://community.cloud.databricks.com/?o=7201742768563847#
Search for anything
ENG
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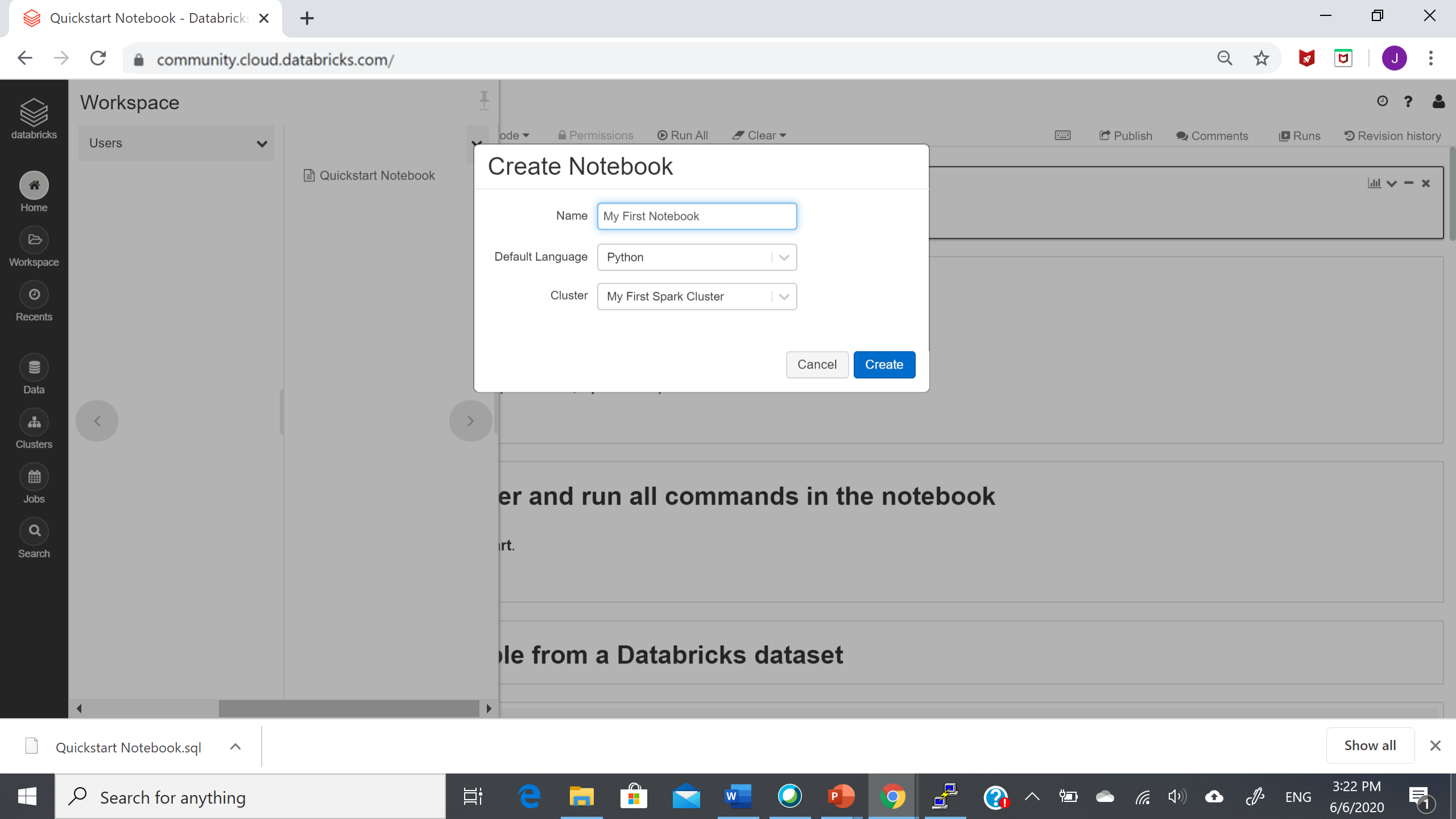
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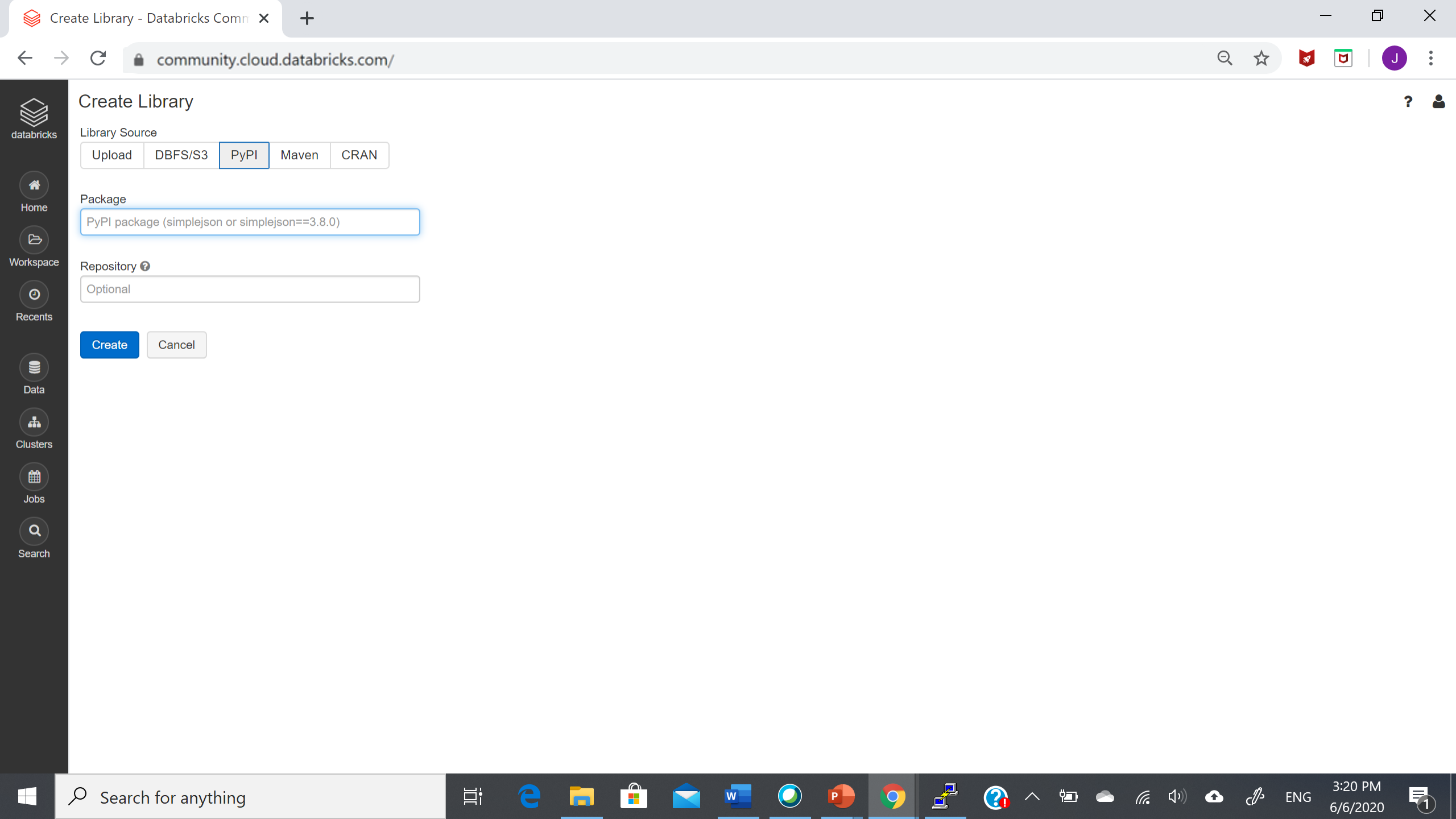
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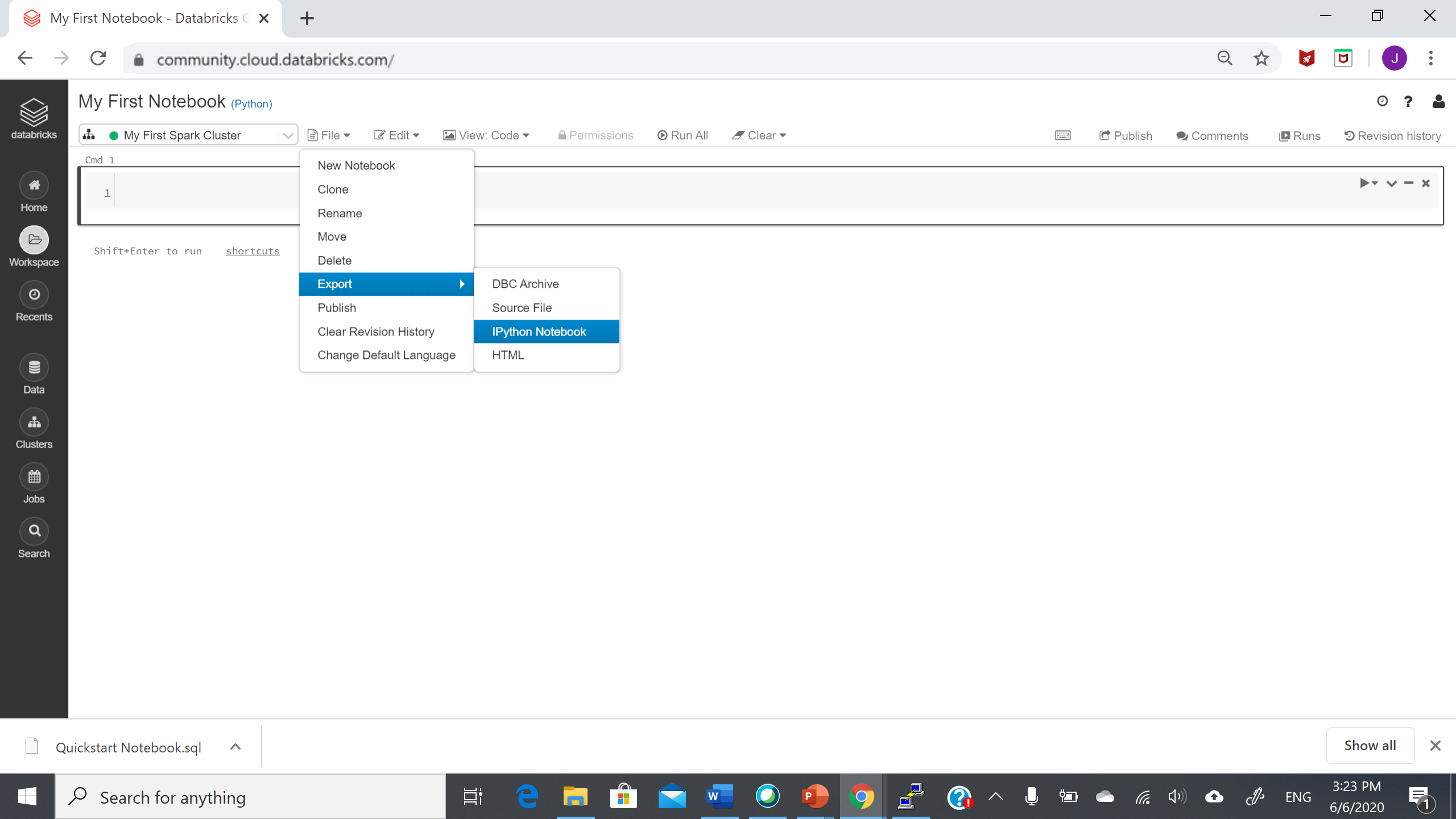
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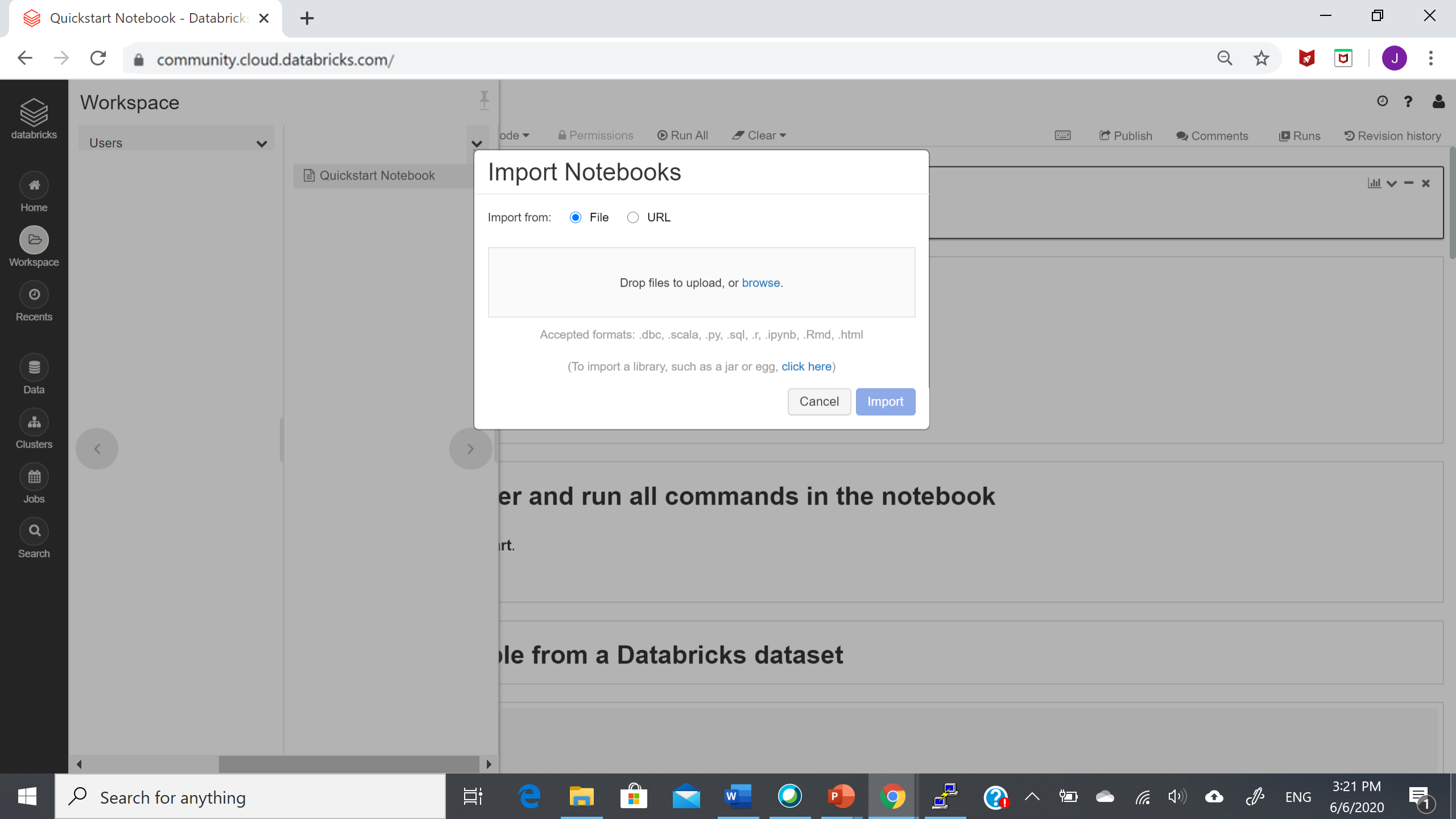
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Import Notebooks
Import from:
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URL
Drop files to upload, or browse.
Accepted formats: .dbc, .scala, .py, .sql, .r, .ipynb, .Rmd, .html
(To import a library, such as a jar or egg, click here)
Cancel
Import
er and run all commands in the notebook
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Quickstart Notebook (SQL)

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Cmd 1

Databricks in 5 minutes

Cmd 2

Create a quickstart cluster

1. In the sidebar, right-click the **Clusters** button and open the link in a new window.
2. On the Clusters page, click **Create Cluster**.
3. Name the cluster **Quickstart**.
4. In the Databricks Runtime Version drop-down, select **6.3 (Scala 2.11, Spark 2.4.4)**.
5. Click **Create Cluster**.

Cmd 3

Attach the notebook to the cluster and run all commands in the notebook

1. Return to this notebook.
2. In the notebook menu bar, select Detached > **Quickstart**.
3. When the cluster changes from to ●, click **Run All**.

Cmd 4

The next command creates a table from a Databricks dataset

Cmd 5

```
1 DROP TABLE IF EXISTS diamonds;
2
3 CREATE TABLE diamonds
```

Search for anything

ENG 3:05 PM 6/6/2020

Quickstart Notebook (SQL)

Cmd 4

The next command creates a table from a Databricks dataset

Cmd 5

```
1 DROP TABLE IF EXISTS diamonds;
2
3 CREATE TABLE diamonds
4 USING csv
5 OPTIONS (path "/databricks-datasets/Rdatasets/data-001/csv/ggplot2/diamonds.csv", header "true")
6
```

OK

Command took 46.18 seconds -- by a user at 6/13/2019, 5:06:53 AM on unknown cluster

Cmd 6

```
1 SELECT * from diamonds
```

_c0	carat	cut	color	clarity	depth	table	price	x	y	z
1	0.23	Ideal	E	SI2	61.5	55	326	3.95	3.98	2.43
2	0.21	Premium	E	SI1	59.8	61	326	3.89	3.84	2.31
3	0.23	Good	E	VS1	56.9	65	327	4.05	4.07	2.31
4	0.29	Premium	I	VS2	62.4	58	334	4.2	4.23	2.63

Showing the first 1000 rows.

Command took 6.11 seconds -- by a user at 6/13/2019, 5:06:53 AM on unknown cluster

Cmd 7

```
1 %python
```

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Quickstart Notebook (SQL)

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Cmd 7

```
%python
diamonds = spark.read.csv("/databricks-datasets/Rdatasets/data-001/csv/ggplot2/diamonds.csv", header="true", inferSchema="true")
diamonds.write.format("delta").save("/delta/diamonds")
```

diamonds: pyspark.sql.dataframe.DataFrame = [_c0: integer, carat: double ... 9 more fields]

Command took 13.50 seconds -- by a user at 6/13/2019, 5:06:53 AM on unknown cluster

Cmd 8

```
DROP TABLE IF EXISTS diamonds;

CREATE TABLE diamonds USING DELTA LOCATION '/delta/diamonds/'
```

OK

Command took 0.77 seconds -- by a user at 6/13/2019, 5:06:53 AM on unknown cluster

Cmd 9

```
SELECT * from diamonds
```

_c0	carat	cut	color	clarity	depth	table	price	x	y	z
1	0.23	Ideal	E	SI2	61.5	55	326	3.95	3.98	2.43
2	0.21	Premium	E	SI1	59.8	61	326	3.89	3.84	2.31
3	0.23	Good	E	VS1	56.9	65	327	4.05	4.07	2.31
4	0.29	Premium	I	VS2	62.4	58	334	4.2	4.23	2.63

Showing the first 1000 rows.

Command took 6.89 seconds -- by a user at 6/13/2019, 5:06:53 AM on unknown cluster

Cmd 10

Search for anything

ENG 3:06 PM 6/6/2020

Quickstart Notebook (SQL)

Command took 6.89 seconds -- by a user at 6/13/2019, 5:06:53 AM on unknown cluster

Cmd 10

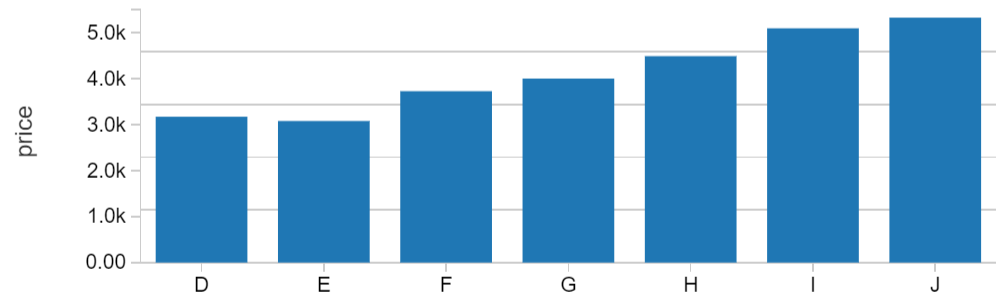
The next command manipulates the data and displays the results

Specifically, the command:

1. Selects color and price columns, averages the price, and groups and orders by color.
2. Displays a table of the results.

Cmd 11

```
1  SELECT color, avg(price) AS price FROM diamonds GROUP BY color ORDER BY color
```



Plot Options...

Command took 2.83 seconds -- by a user at 6/13/2019, 5:06:53 AM on unknown cluster

Cmd 12

Convert the table to a chart

Quickstart Notebook - Databricks

community.cloud.databricks.com/ ...067445025/command/1158110067445026

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Quickstart Notebook (SQL)

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Convert the table to a chart

Under the table, click the bar chart icon.

Cmd 13

Repeat the same operations using Python DataFrame API.

This is a SQL notebook; by default command statements are passed to a SQL interpreter. To pass command statements to a Python interpreter, include the `%python` magic command.

Cmd 14

The next command creates a DataFrame from a Databricks dataset

Cmd 15

```
%python
diamonds = spark.read.csv("/databricks-datasets/Rdatasets/data-001/csv/ggplot2/diamonds.csv", header="true", inferSchema="true")
```

diamonds: pyspark.sql.dataframe.DataFrame = [_c0: integer, carat: double ... 9 more fields]

Command took 1.67 seconds -- by a user at 6/13/2019, 5:06:53 AM on unknown cluster

Cmd 16

The next command manipulates the data and displays the results

Cmd 17

```
%python
from pyspark.sql.functions import avg

display(diamonds.select("color","price").groupBy("color").agg(avg("price")).sort("color"))
```

Search for anything

ENG 3:08 PM 6/6/2020

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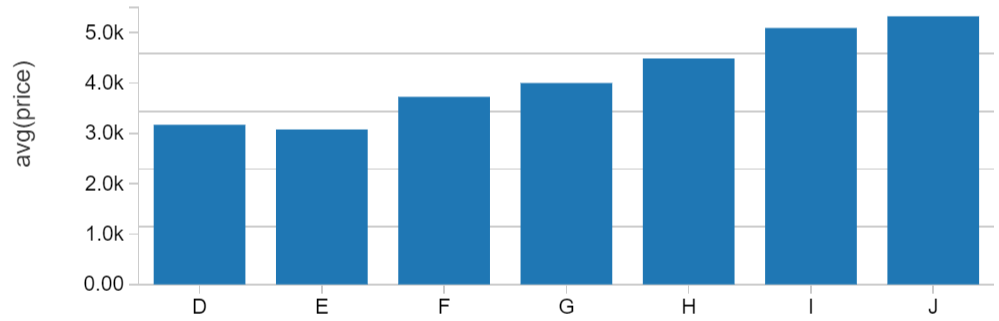
The next command manipulates the data and displays the results

Cmd 17

```
1 %python
2 from pyspark.sql.functions import avg
3
4 display(diamonds.select("color","price").groupBy("color").agg(avg("price")).sort("color"))
```



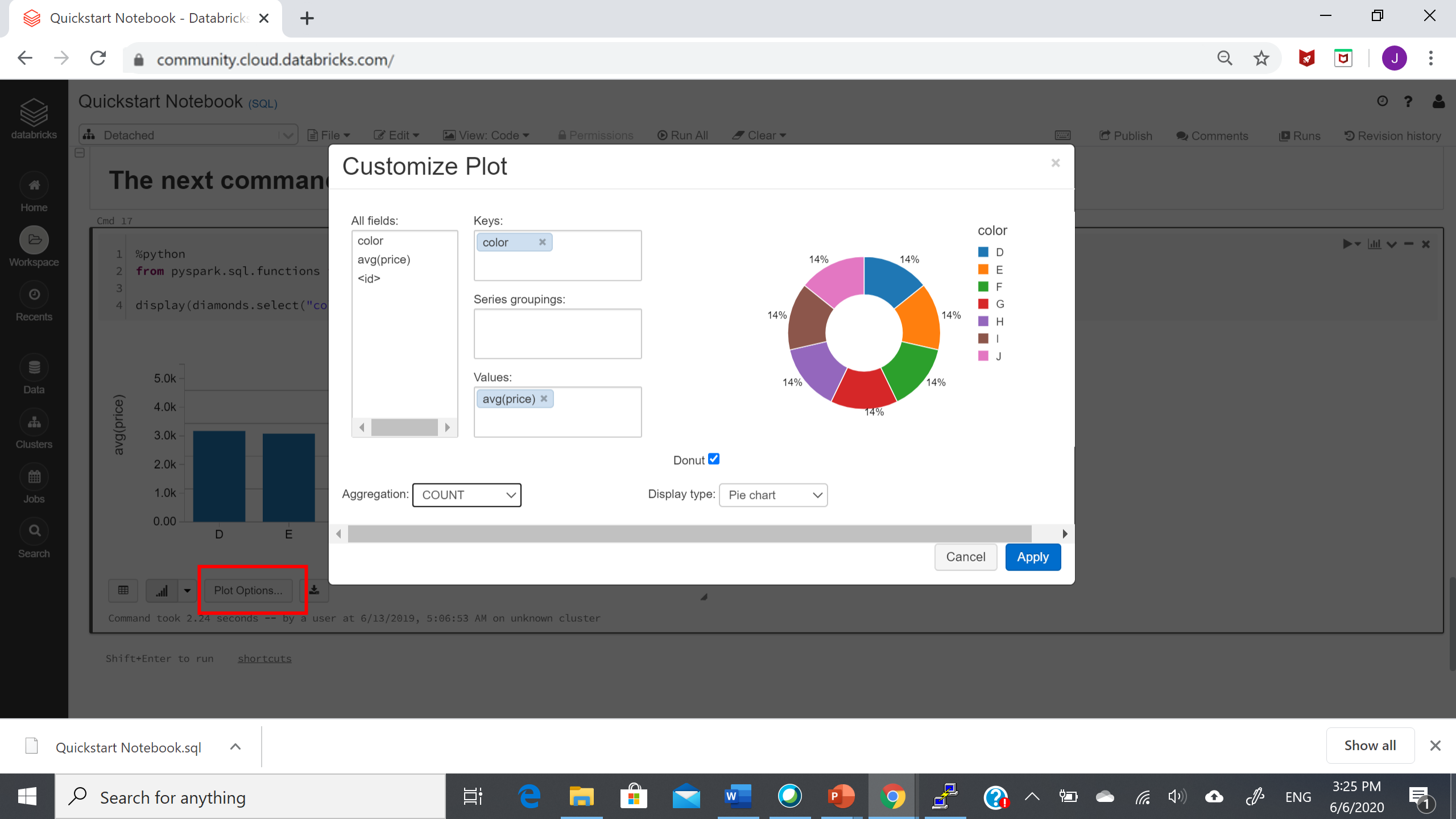
Plot Options...

Command took 2.24 seconds -- by a user at 6/13/2019, 5:06:53 AM on unknown cluster

Shift+Enter to run shortcuts

Search for anything

ENG 3:10 PM 6/6/2020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Cmd 17
%python
from pyspark.sql.functions
display(diamonds.select("co
avg(price)
5.0k
4.0k
3.0k
2.0k
1.0k
0.00
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Plot Options...
Command took 2.24 seconds -- by a user at 6/13/2019, 5:06:53 AM on unknown cluster
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shortcuts
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avg(price)
<id>
Keys:
color
Series groupings:
Values:
avg(price)
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Mobile Sample (SQL)

Attached: reporting | View: Code | File | Permissions | Run All | Comments | Revision history

```
> select m.ClientID, c.CountryCode3, m.SessionID
  from mobile_sample m
     join countrycodes c
        on m.Country = c.CountryName
```

(4) Spark Jobs

ClientID	CountryCode3	SessionID	DeviceMake
96046	ARG	0	ASUS
96987	ARG	0	ASUS
127767	ARG	0	ASUS
3846	AUS	0	SAMSUNG
8509	AUS	0	Apple
10085	AUS	0	HTC
14719	AUS	0	HTC
15286	AUS	0	Apple
15286	AUS	0	Apple
15286	AUS	0	Apple
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Bar | Quantile | Scatter | Histogram | Map | Box plot | Line | Q-Q plot | Area | Pivot | Pie

Command took 2.75s

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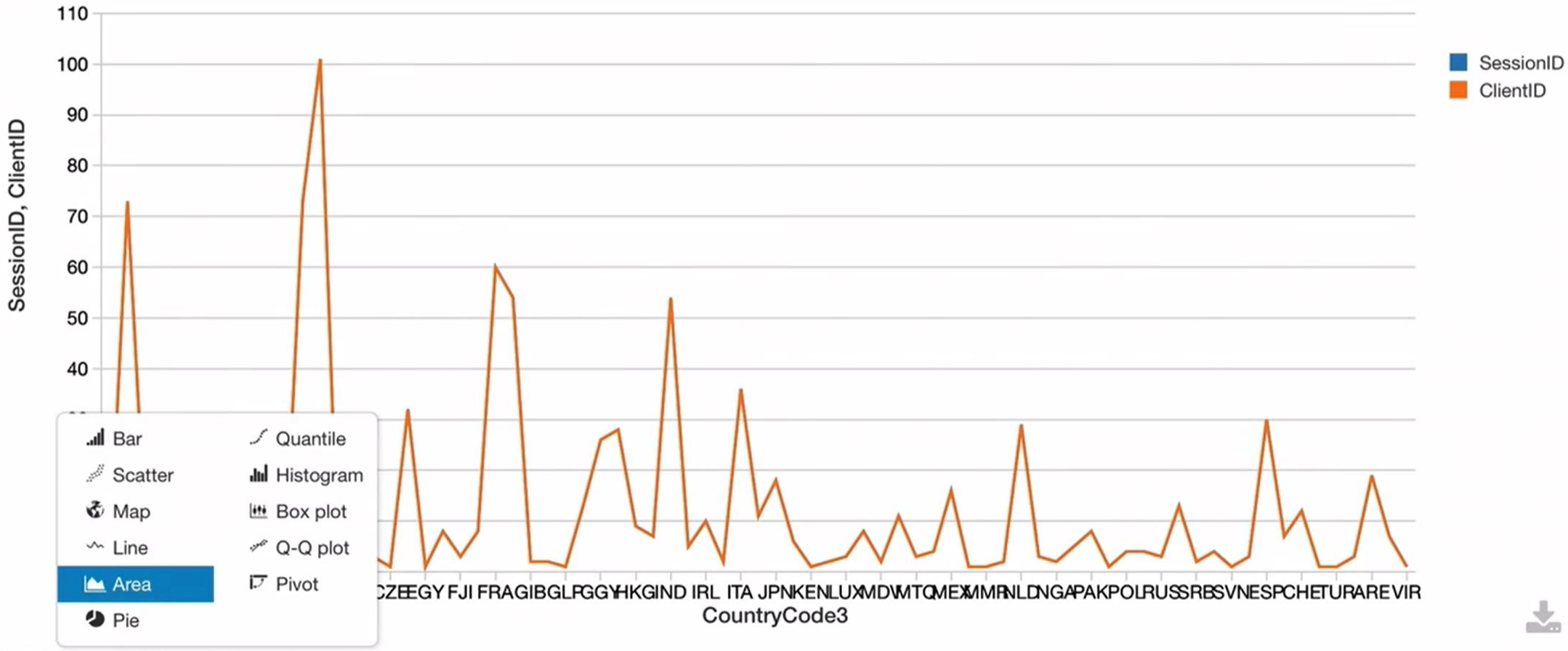
Mobile Sample (SQL)

Attached: reporting | View: Code | File | Permissions | Run All | Comments | Revision history

```
> select m.ClientID, c.CountryCode3, m.SessionID
  from mobile_sample m
     join countrycodes c
        on m.Country = c.CountryName
```

(4) Spark Jobs



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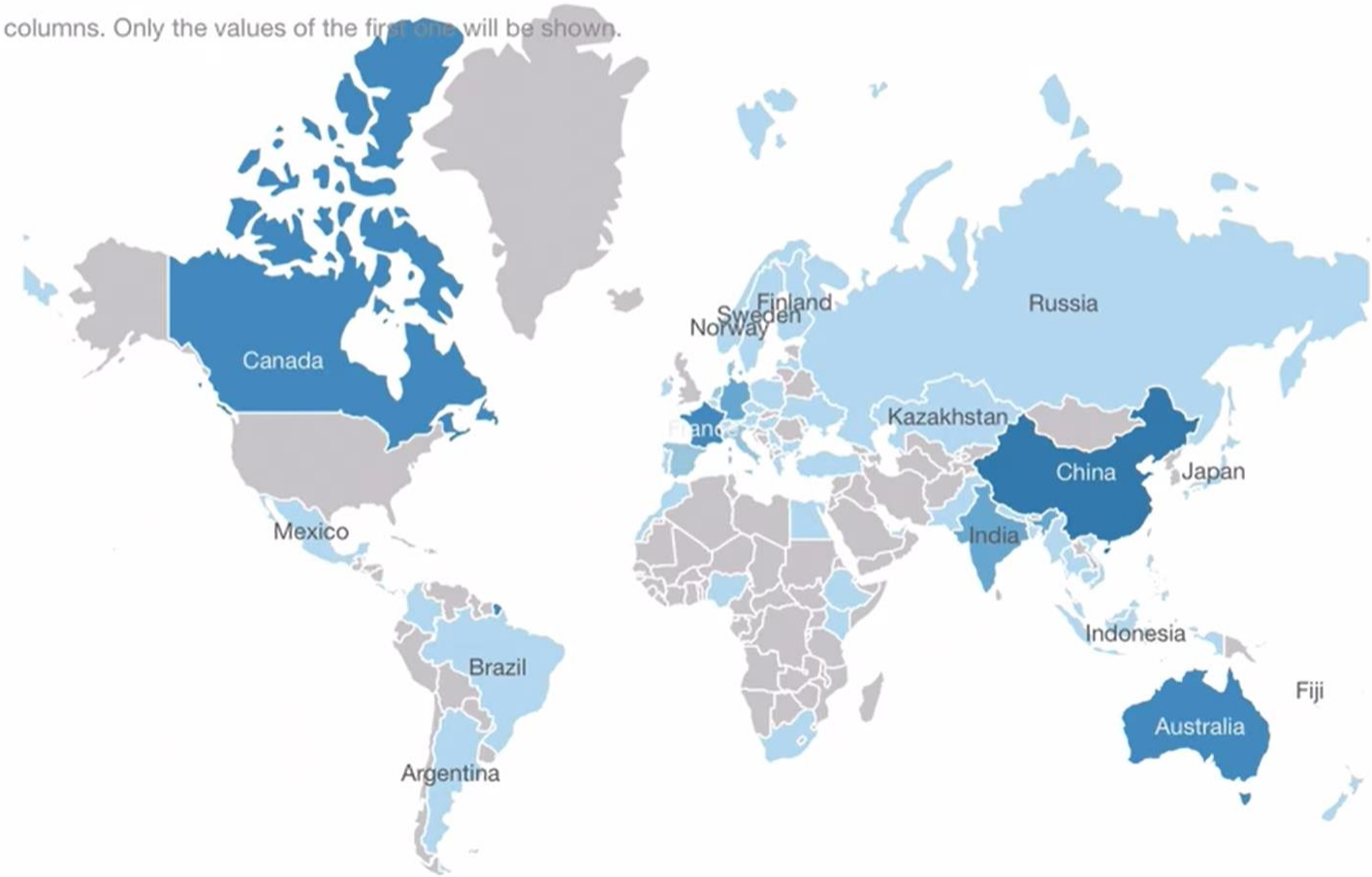
Mobile Sample (SQL)

Attached: reporting | View: Code | File | Permissions | Run All | Comments | Revision history

```
> select m.ClientID, c.CountryCode3, m.SessionID
  from mobile_sample m
     join countrycodes c
        on m.Country = c.CountryName
```

(4) Spark Jobs

More than two numerical columns. Only the values of the first one will be shown.



Plot Options...