Hive Lab

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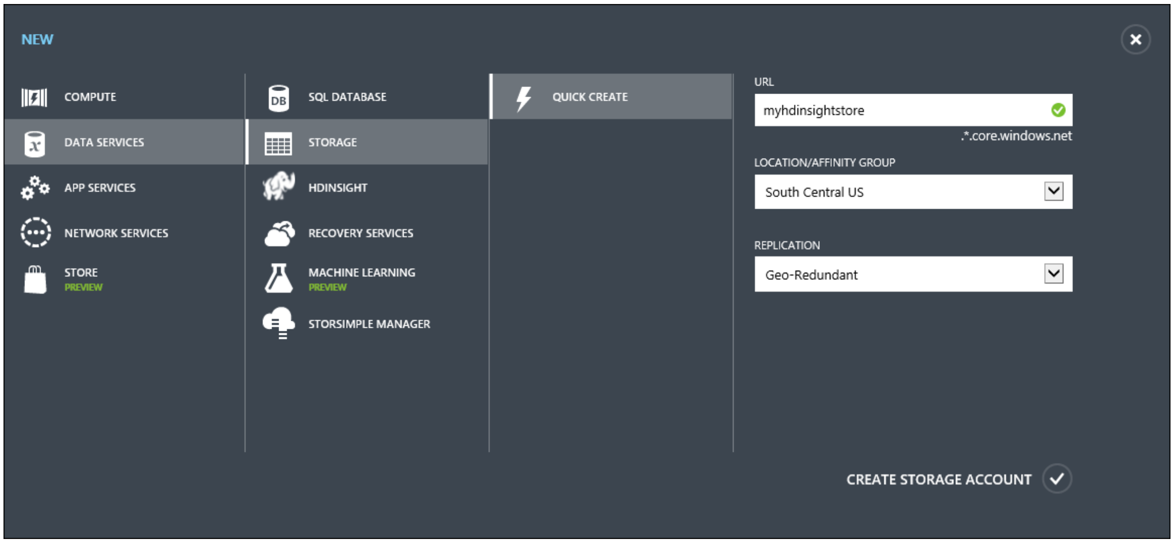
Lab 1: Provisioning an HDInsight Hadoop Cluster

Exercise 1: Create an Azure Storage Account

1. Sign into the Azure portal.
    a. If not sign up for a free trial http://azure.microsoft.com/en-us/pricing/free-trial/
2. Create a data storage for the Hadoop cluster.
    a. Click **New>Data Services>Storage>Quick Create**
    b. The URL will be the name of your storage and serve as a pseudo primary key for your storage name. Assign a unique name to it. It's called a URL because the storage account can be referenced directly via HTTP, ex: https://mystorageaccount.blob.core.windows.net/
    c. Select a region that is closest to you, your users, or your Hadoop clusters.



URL: myhdinsightstore .*.core.windows.net

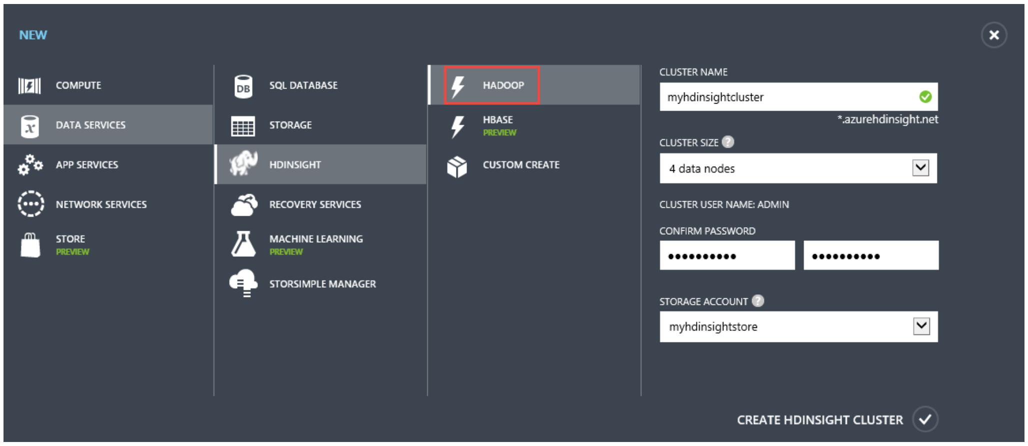
LOCATION/AFFINITY GROUP: South Central US

REPLICATION: Geo-Redundant

Exercise 2: Create an HDInsight Hadoop cluster.

Once your storage account has been created (~2 minute process), create an HDInsight Hadoop cluster.

1. Starting from the bottom-left corner of your Azure portal (manage.windowsazure.com), click **New>Data Services>HDInsight>Hadoop**
2. Assign a cluster name.
3. Select anywhere between 1-4 nodes (1-2 recommended).
   a. More nodes equates to more computers for parallel processing, however, it will result in higher usage fees.
4. Create a password for your Hadoop cluster.
5. Reference the storage account you just made.



CLUSTER NAME: myhdinsightcluster ✓ *.azurehdinsight.net

CLUSTER SIZE: 4 data nodes

CLUSTER USER NAME: ADMIN

CONFIRM PASSWORD: •••••••••• ••••••••••

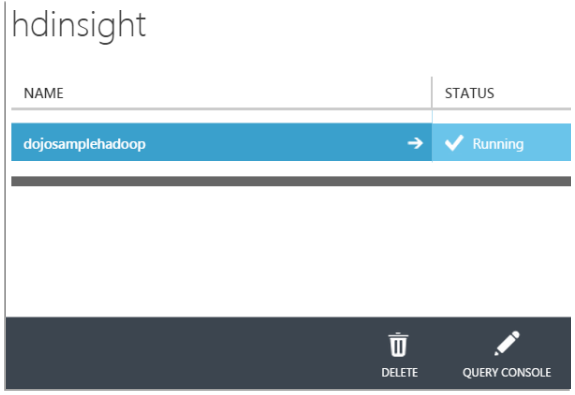
STORAGE ACCOUNT: myhdinsightstore

   d. The cluster will take ~15 minutes to be up and running.

Lab 2: Hive & Query Console

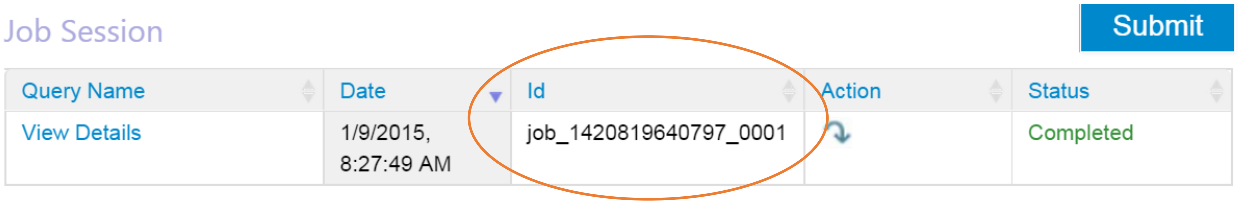
Exercise 1: Query Console

1. Select **HDINSIGHT** from the left-hand menu on the Azure Portal.
   a. Select the Hadoop cluster from the previous lab.
   b. From the bottom menu, click **Query Console**.


hdinsight

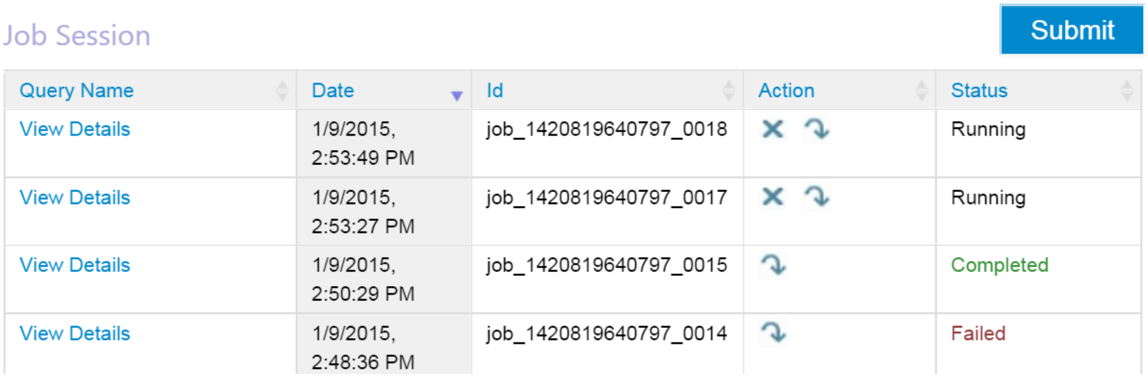
NAME	STATUS
dojosamplehadoop	✓ Running

   c. You will be prompted to log in.
      i. Input “admin” for the username, and then input the password you chose for the Hadoop cluster.
   d. Select Hive editor at the top.
2. Run the default query by clicking submit.
   a. The query will be added to “job session” at the bottom of the screen.
      i. This is a queue of jobs.
   b. Each query will take a minimum of ~2 minutes do to overhead.
   c. HiveQL statements are not case sensitive. So “**select * from table**”, “**SELECT * FROM table**”, and “**SeLeCt * fRoM table**” will all yield the same result.
   d. Note the jobID of the query. The job session queue will only display recent jobs. You can view all jobs in “Job History” at the top.


Job Session

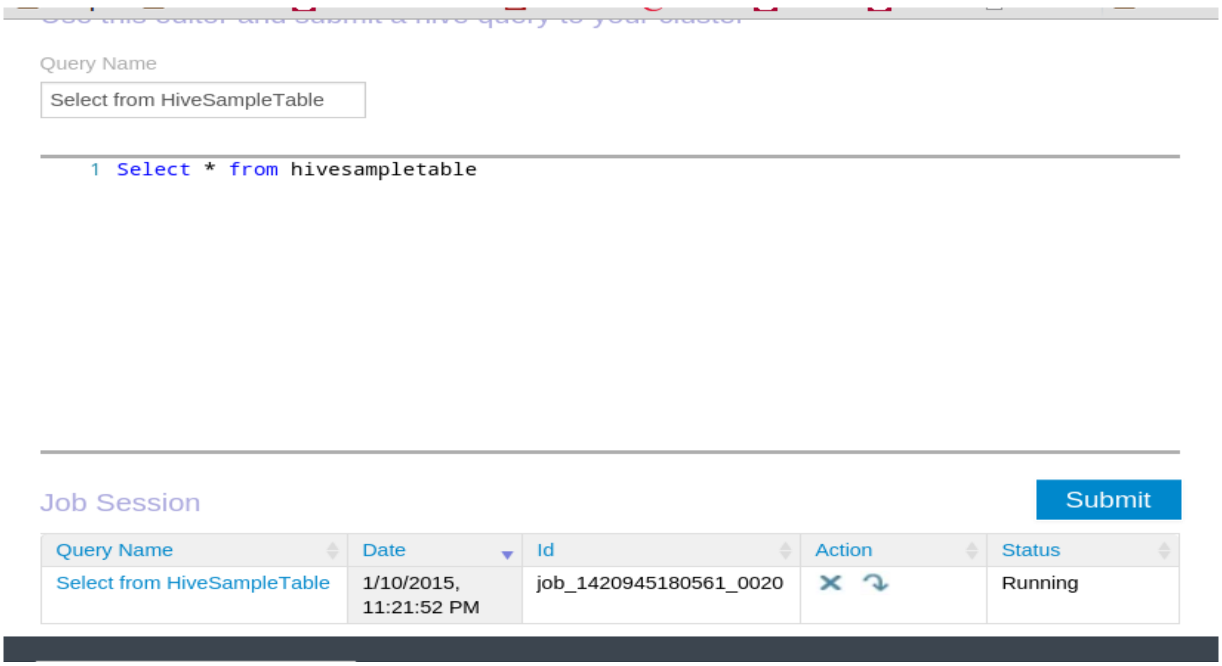
Query Name	Date	Id	Action	Status
View Details	1/9/2015, 8:27:49 AM	job_1420819640797_0001		Completed

   e. It’s possible to fire off multiple jobs at the same time and wait for them to finish. Click “view details” on the jobs that are running; it will populate once the job is finished.


Job Session

Query Name	Date	Id	Action	Status
View Details	1/9/2015, 2:53:49 PM	job_1420819640797_0018	✕ ↷	Running
View Details	1/9/2015, 2:53:27 PM	job_1420819640797_0017	✕ ↷	Running
View Details	1/9/2015, 2:50:29 PM	job_1420819640797_0015	↷	Completed
View Details	1/9/2015, 2:48:36 PM	job_1420819640797_0014	↷	Failed

f. Name queries by filling in **Query Name** above the console. Doing this will replace the "view details" title with the selected query name. Just as before, you can click on the query name to see the details and the output of the query.


Query Name: Select from HiveSampleTable

```
Select * from hivesampletable
```

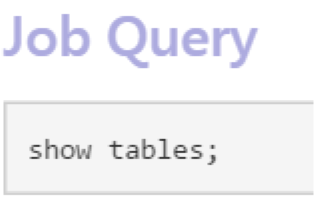
Job Session

Query Name	Date	Id	Action	Status
Select from HiveSampleTable	1/10/2015, 11:21:52 PM	job_1420945180561_0020	✕ ↷	Running

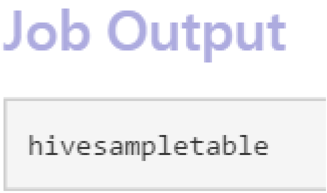
Exercise 2: Exploratory Queries

Hive is almost like SQL. To run multiple queries in the same block, you must end each individual query with a semicolon (';').

1. Which Hive tables are present within this Hadoop cluster?

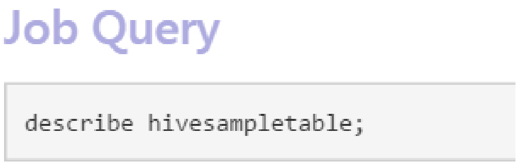

Job Query

```
show tables;
```

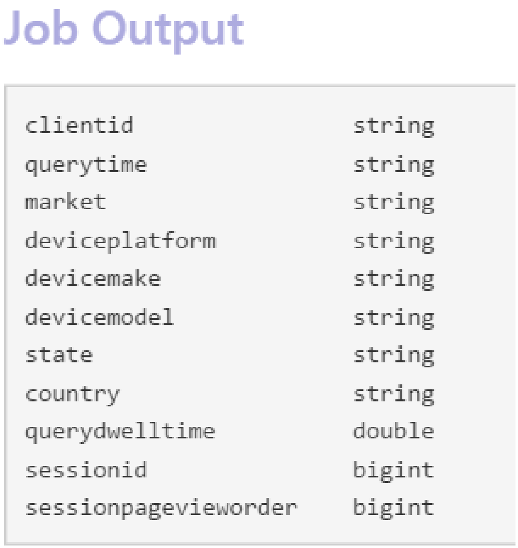

Job Output

```
hivesampletable
```

2. Let's get information about hivesampletable.


Job Query

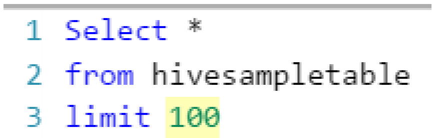
```
describe hivesampletable;
```


Job Output

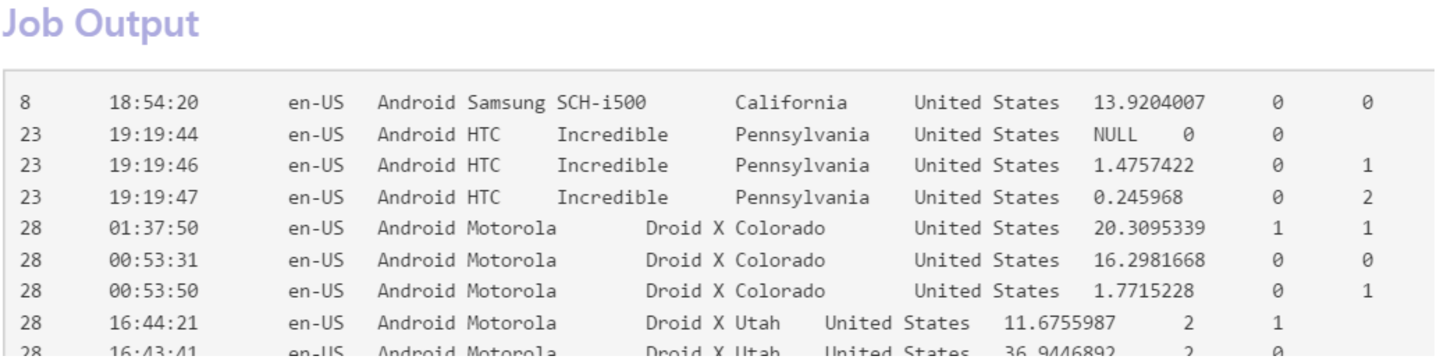
```
clientid                string
querytime               string
market                  string
deviceplatform          string
devicemake              string
devicemodel             string
state                   string
country                 string
querydwelltime          double
sessionid               bigint
sessionpagevieworder    bigint
```

   a. For a full list of class types visit http://docs.hortonworks.com/HDPDocuments/HDP1/HDP-1.2.2/ds_Hive/language_manual/datatypes.html
      i. This type list will be important for adding more data and creating tables
      ii. Horton Works is a business that focuses on the development and support of Hadoop.

3. Let's get a preview of our data. Use the "limit" clause at the end of the HiveQL statement. The star tells Hive to grab each rows and limit returns X number of rows at random.



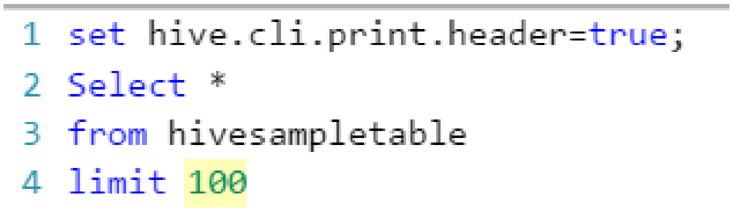
```
Select *
from hivesampletable
limit 100
```



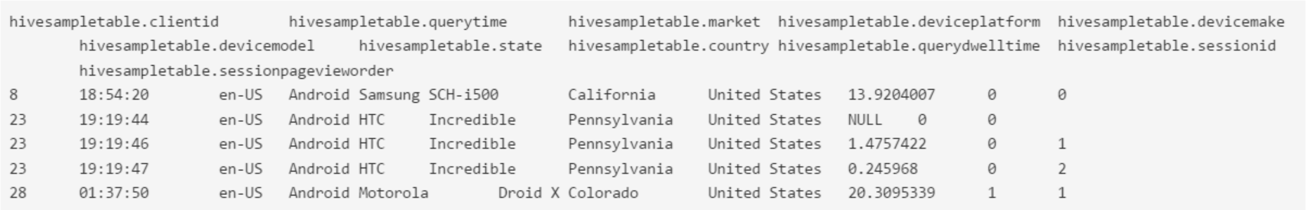
Job Output

```
8       18:54:20        en-US   Android Samsung SCH-i500        California      United States   13.9204007      0       0
23      19:19:44        en-US   Android HTC     Incredible      Pennsylvania    United States   NULL    0       0
23      19:19:46        en-US   Android HTC     Incredible      Pennsylvania    United States   1.4757422       0       1
23      19:19:47        en-US   Android HTC     Incredible      Pennsylvania    United States   0.245968        0       2
28      01:37:50        en-US   Android Motorola        Droid X Colorado        United States   20.3095339      1       1
28      00:53:31        en-US   Android Motorola        Droid X Colorado        United States   16.2981668      0       0
28      00:53:50        en-US   Android Motorola        Droid X Colorado        United States   1.7715228       0       1
28      16:44:21        en-US   Android Motorola        Droid X Utah    United States   11.6755987      2       1
28      16:43:41        en-US   Android Motorola        Droid X Utah    United States   36.9446892      2       0
```

4. Include "**set hive.cli.print.header=true;**" to see headers.
    a. Hive does not print headers by default. Hadoop is designed for unstructured data, which does not require headers or prescribed schemas.
    b. Notice the ";" at the end. That means it's a separate statement altogether. This is a Hive command rather than a HiveQL statement.

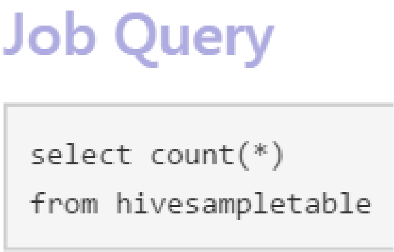


```
set hive.cli.print.header=true;
Select *
from hivesampletable
limit 100
```



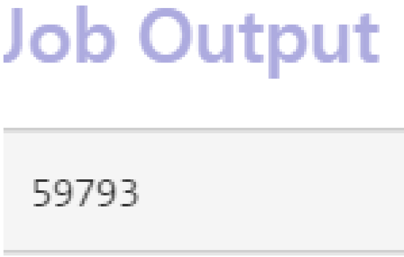
```
hivesampletable.clientid        hivesampletable.querytime       hivesampletable.market  hivesampletable.deviceplatform  hivesampletable.devicemake
        hivesampletable.devicemodel     hivesampletable.state   hivesampletable.country hivesampletable.querydwelltime  hivesampletable.sessionid
        hivesampletable.sessionpagevieworder
8       18:54:20        en-US   Android Samsung SCH-i500        California      United States   13.9204007      0       0
23      19:19:44        en-US   Android HTC     Incredible      Pennsylvania    United States   NULL    0       0
23      19:19:46        en-US   Android HTC     Incredible      Pennsylvania    United States   1.4757422       0       1
23      19:19:47        en-US   Android HTC     Incredible      Pennsylvania    United States   0.245968        0       2
28      01:37:50        en-US   Android Motorola        Droid X Colorado        United States   20.3095339      1       1
```

5. Run the following query to find the number of rows
    a. Count(*) is the command to count all rows.



Job Query

```
select count(*)
from hivesampletable
```

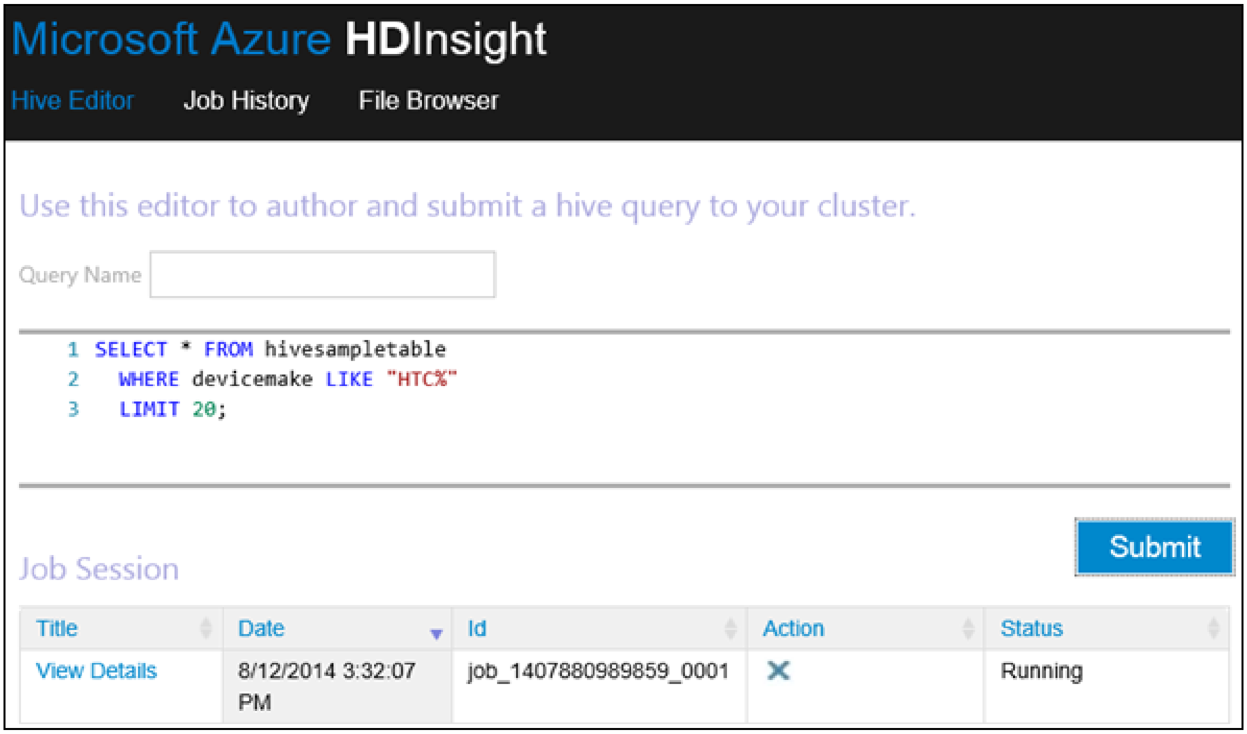


Job Output

```
59793
```

Exercise 3: Structured Queries

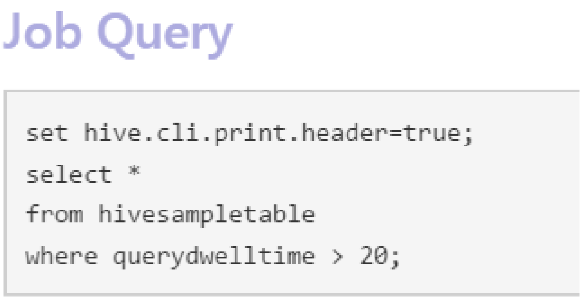
1. Run the following query print the first 20 entries where the device maker starts with HTC.


Microsoft Azure HDInsight
Hive Editor
Job History
File Browser
Use this editor to author and submit a hive query to your cluster.
Query Name
Submit
Job Session

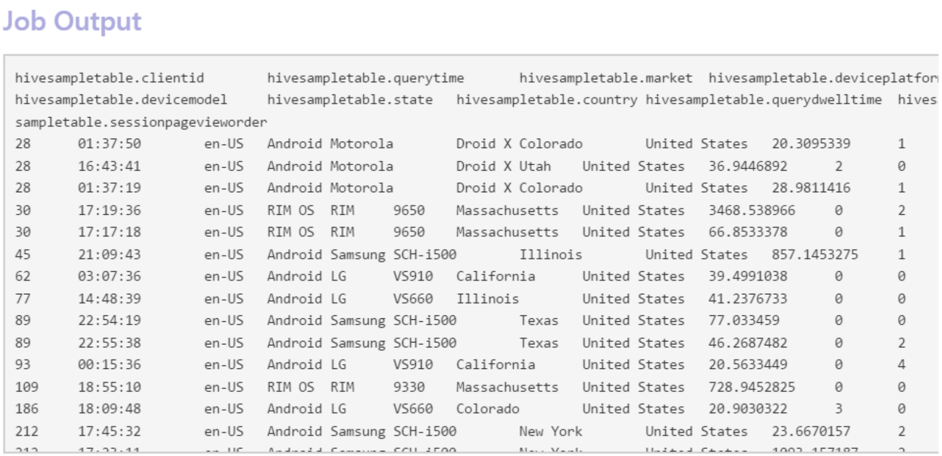
```
SELECT * FROM hivesampletable
  WHERE devicemake LIKE "HTC%"
  LIMIT 20;
```

Title	Date	Id	Action	Status
View Details	8/12/2014 3:32:07 PM	job_1407880989859_0001	✕	Running

2. Run the following query to see the first 20 entries where client dwell time exceeded 20 seconds. These people are probably the more interested customers. Let’s isolate them.



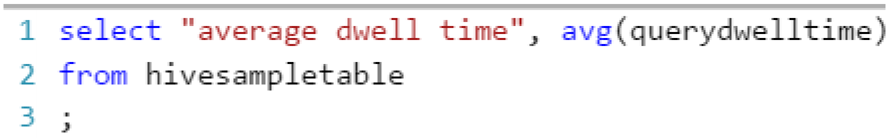
```
set hive.cli.print.header=true;
select *
from hivesampletable
where querydwelltime > 20;
```



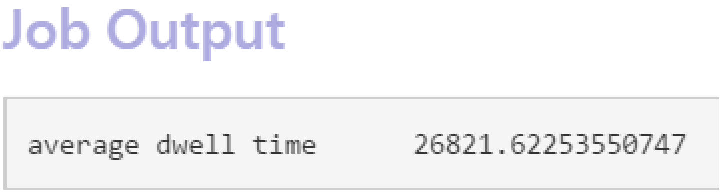
Job Output

```
hivesampletable.clientid        hivesampletable.querytime       hivesampletable.market  hivesampletable.deviceplatfor
hivesampletable.devicemodel     hivesampletable.state   hivesampletable.country hivesampletable.querydwelltime  hives
sampletable.sessionpagevieworder
28      01:37:50        en-US   Android Motorola        Droid X Colorado        United States   20.3095339      1
28      16:43:41        en-US   Android Motorola        Droid X Utah    United States   36.9446892      2       0
28      01:37:19        en-US   Android Motorola        Droid X Colorado        United States   28.9811416      1
30      17:19:36        en-US   RIM OS  RIM     9650    Massachusetts   United States   3468.538966     0       2
30      17:17:18        en-US   RIM OS  RIM     9650    Massachusetts   United States   66.8533378      0       1
45      21:09:43        en-US   Android Samsung SCH-i500        Illinois        United States   857.1453275     1
62      03:07:36        en-US   Android LG      VS910   California      United States   39.4991038      0       0
77      14:48:39        en-US   Android LG      VS660   Illinois        United States   41.2376733      0       0
89      22:54:19        en-US   Android Samsung SCH-i500        Texas   United States   77.033459       0       0
89      22:55:38        en-US   Android Samsung SCH-i500        Texas   United States   46.2687482      0       2
93      00:15:36        en-US   Android LG      VS910   California      United States   20.5633449      0       4
109     18:55:10        en-US   RIM OS  RIM     9330    Massachusetts   United States   728.9452825     0       0
186     18:09:48        en-US   Android LG      VS660   Colorado        United States   20.9030322      3       0
212     17:45:32        en-US   Android Samsung SCH-i500        New York        United States   23.6670157      2
```

3. What was the average dwell time? Run the following query to find out.



```sql
select "average dwell time", avg(querydwelltime)
from hivesampletable
;
```

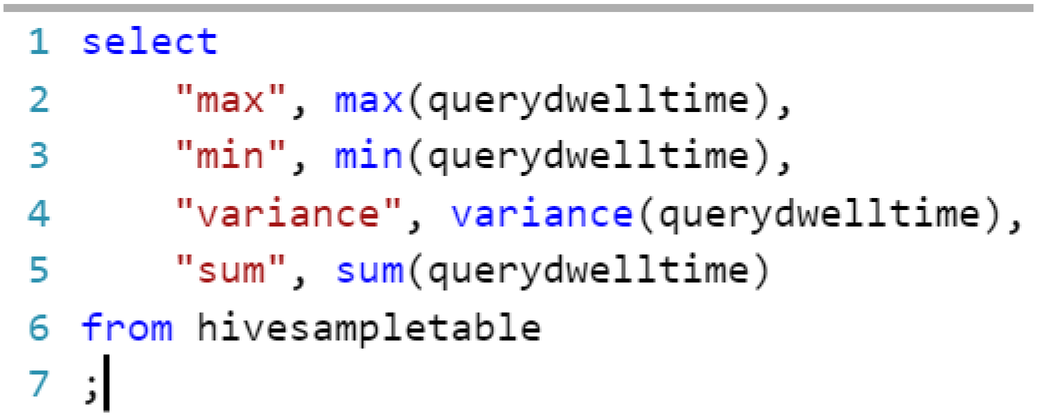


Job Output

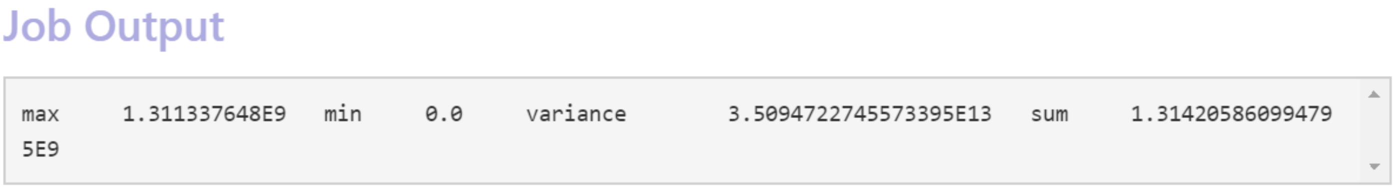
```
average dwell time      26821.62253550747
```

   a. avg(querydwelltime) returns the average from the entire column
   b. The average dwell time is equivalent to 4.5 hours. Perhaps there is a reason for such a high number. Let's explore further.

4. Run the following query to find the min, max, variance, and sum of the dwell time.



```
select
    "max", max(querydwelltime),
    "min", min(querydwelltime),
    "variance", variance(querydwelltime),
    "sum", sum(querydwelltime)
from hivesampletable
;
```

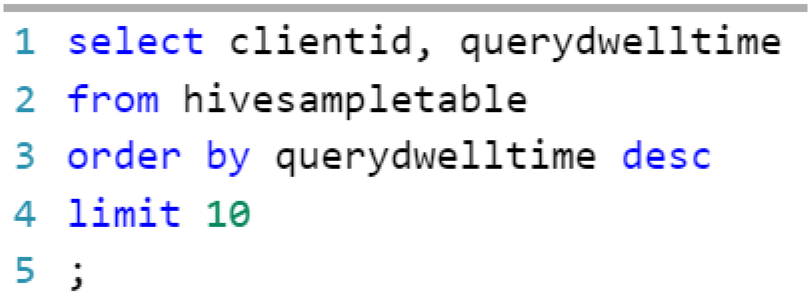


Job Output

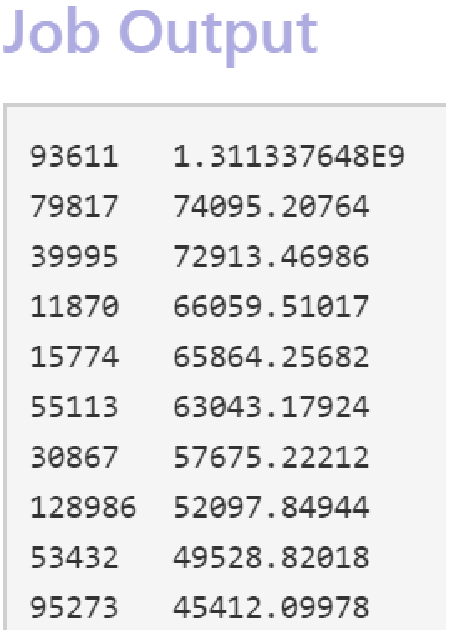
```
max     1.311337648E9    min     0.0      variance        3.5094722745573395E13    sum     1.31420586099479
5E9
```

   a. The variance and maximum values are incredibly large numbers. It looks like an outlier is throwing off our summary statistics. Let’s grab the top 10 dwell times to check.

5. Run the query below to print the 10 largest dwell time in descending order.



```
select clientid, querydwelltime
from hivesampletable
order by querydwelltime desc
limit 10
;
```



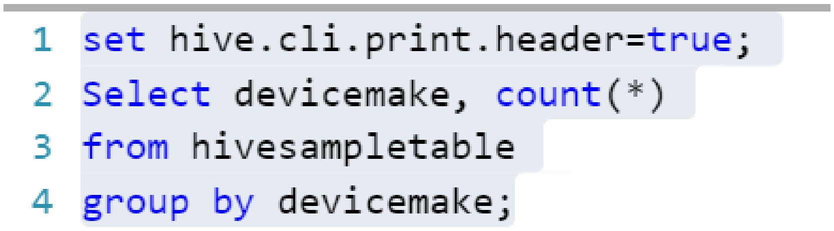
Job Output

```
93611   1.311337648E9
79817   74095.20764
39995   72913.46986
11870   66059.51017
15774   65864.25682
55113   63043.17924
30867   57675.22212
128986  52097.84944
53432   49528.82018
95273   45412.09978
```

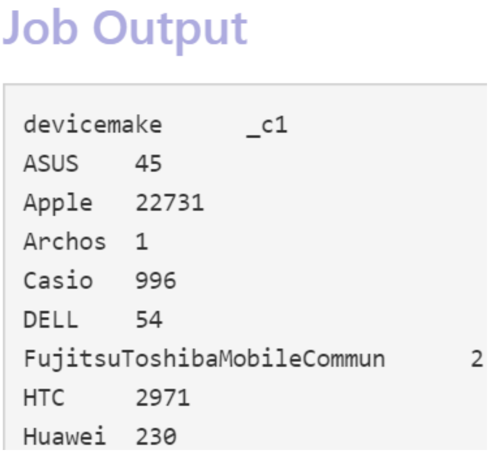
   a. “order by” ensures total population ordering, which can take a very long time with a big dataset. This is why Hive also supports “sort by”, which is far less time consuming. It sorts post query and will be demonstrated in a later exercise.

b. The highest value appears to be an incredibly large outlier. It equates to 1000 years and is almost 1800 times the next value, which is converts to around 22 hours.

6. What is the distribution of our devices? Run the following query to find the total devices for each brand.



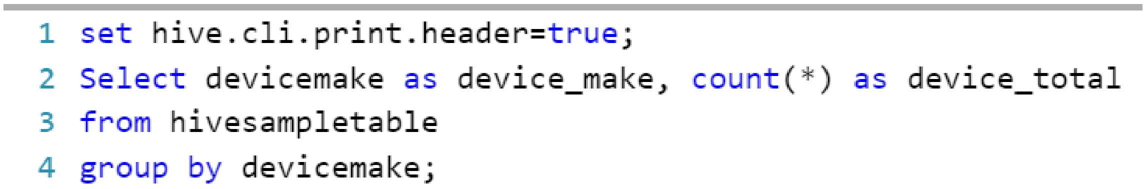
```
set hive.cli.print.header=true;
Select devicemake, count(*)
from hivesampletable
group by devicemake;
```



Job Output

```
devicemake      _c1
ASUS    45
Apple   22731
Archos  1
Casio   996
DELL    54
FujitsuToshibaMobileCommun      2
HTC     2971
Huawei  230
```

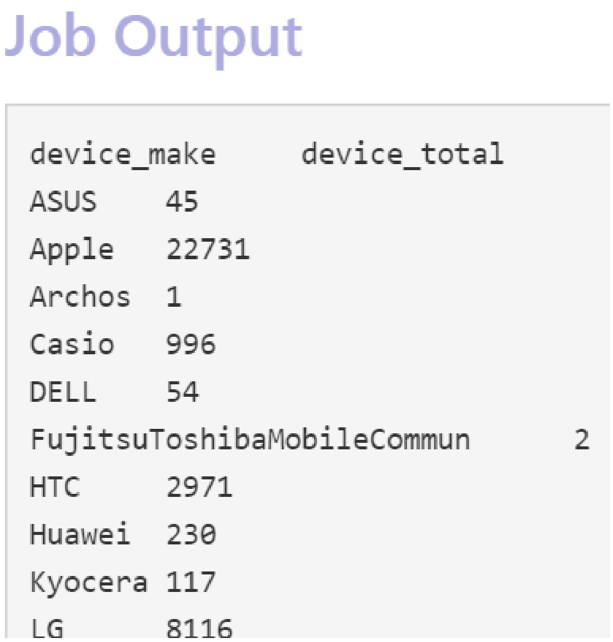
7. The next query renames the queried columns using the “**as**” clause.



```
set hive.cli.print.header=true;
Select devicemake as device_make, count(*) as device_total
from hivesampletable
group by devicemake;
```

a. HiveQL syntax does not use quotes around the new names. This is a subtle difference from SQL.

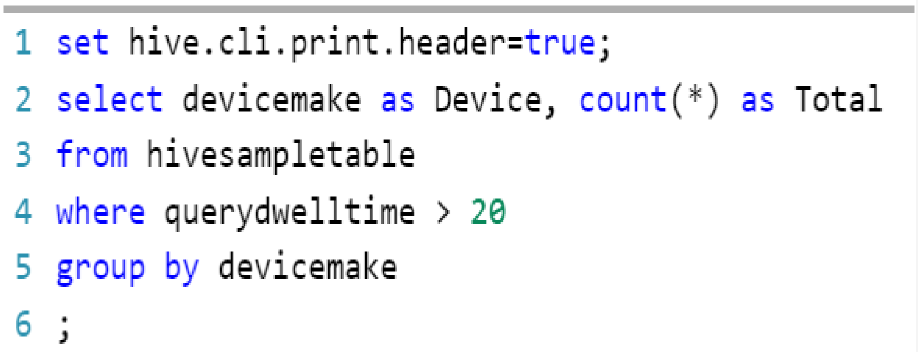
b. Also note that we’re still explicitly stating that we want headers in our queries as a separate statement, even though we are predefining our own metadata.



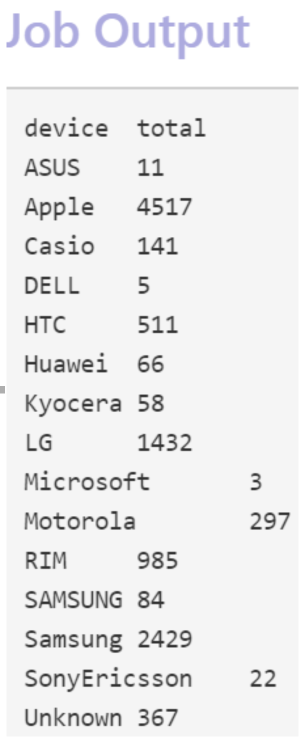
Job Output

```
device_make     device_total
ASUS    45
Apple   22731
Archos  1
Casio   996
DELL    54
FujitsuToshibaMobileCommun      2
HTC     2971
Huawei  230
Kyocera 117
LG      8116
```

8. Let’s get the frequency counts by devices where dwell times where higher than 20 second. This will filter out the devices that aren’t generating enough engagement.
   a. Apply a “where” clause before the group by.
   b. Examine how the totals dropped.



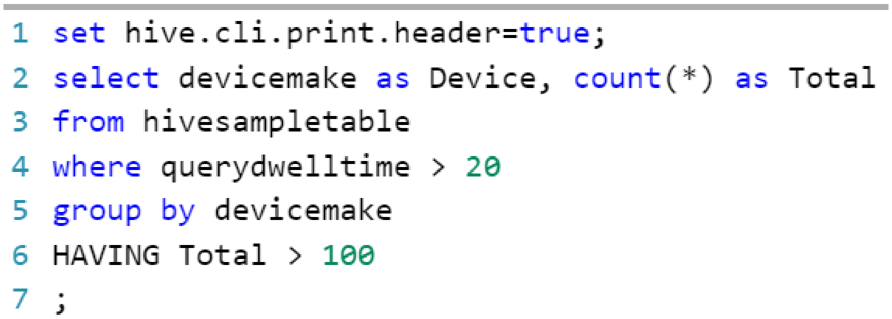
```
set hive.cli.print.header=true;
select devicemake as Device, count(*) as Total
from hivesampletable
where querydwelltime > 20
group by devicemake
;
```



Job Output

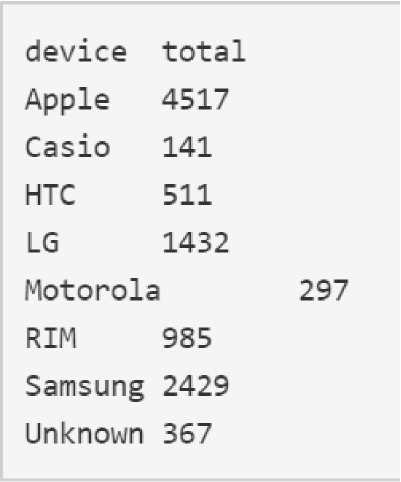
```
device  total
ASUS    11
Apple   4517
Casio   141
DELL    5
HTC     511
Huawei  66
Kyocera 58
LG      1432
Microsoft       3
Motorola        297
RIM     985
SAMSUNG 84
Samsung 2429
SonyEricsson    22
Unknown 367
```

9. To focus on the top brands, let’s include those with 100 dwell times greater than 20 seconds. Use the “HAVING” clause since the filter occurs after the grouping.



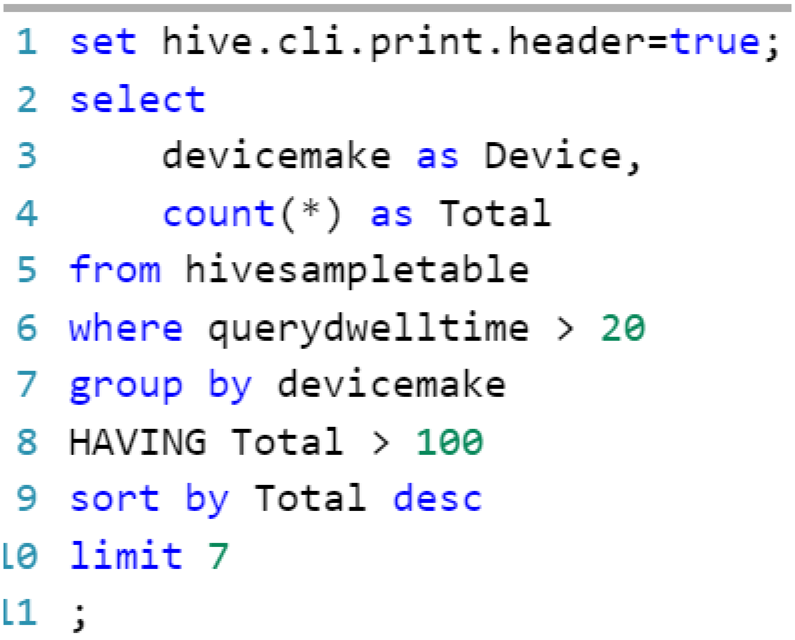
```
set hive.cli.print.header=true;
select devicemake as Device, count(*) as Total
from hivesampletable
where querydwelltime > 20
group by devicemake
HAVING Total > 100
;
```

Job Output



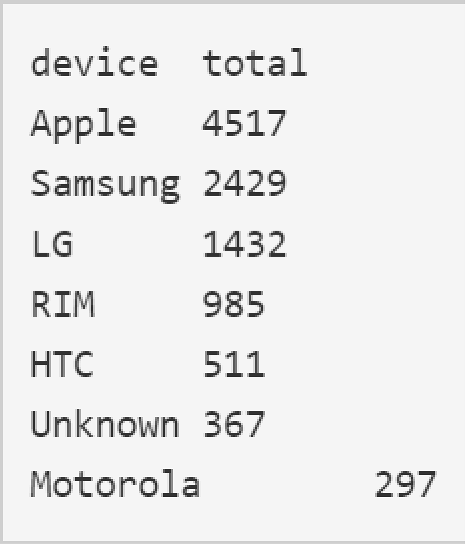
```
device  total
Apple   4517
Casio   141
HTC     511
LG      1432
Motorola        297
RIM     985
Samsung 2429
Unknown 367
```

10. To finish this lab, let’s print the previous query in descending order by using the “sort by” clause. Limit the query to the 7 most engaging brands.
    a. The “sort by” clause will ensure that the final group-by list will be sorted instead of the entire dataset, unlike “order by”.



```
set hive.cli.print.header=true;
select
    devicemake as Device,
    count(*) as Total
from hivesampletable
where querydwelltime > 20
group by devicemake
HAVING Total > 100
sort by Total desc
limit 7
;
```

Job Output



```
device  total
Apple   4517
Samsung 2429
LG      1432
RIM     985
HTC     511
Unknown 367
Motorola        297
```

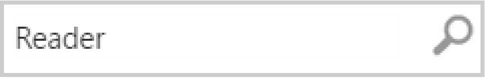
Lab 3: Hive with Azure Machine Learning Studio

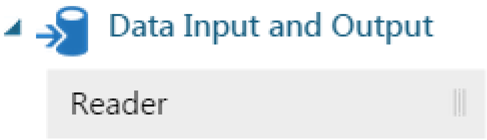
Usually reading and uploading hive tables requires table creation, metadata creation, data upload, and data parsing onto the HDFS. Azure ML completely automates this process and is currently the only tool to do so.

Exercise 1: Hive Queries using Azure ML

This lab requires a Hadoop cluster.

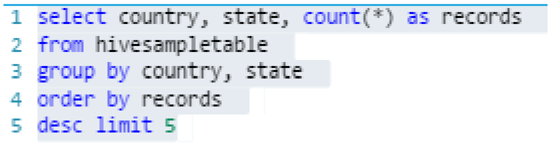
1. Open a new experiment and drag in a Reader module.





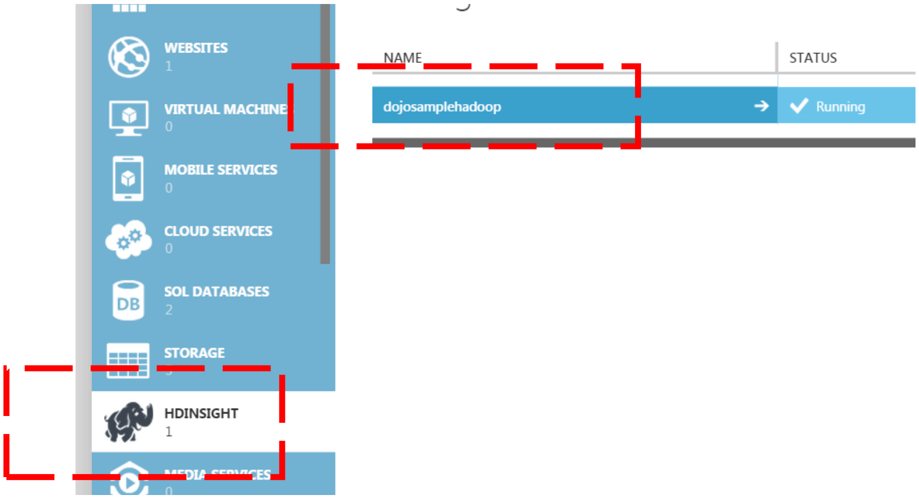
2. Populate the required fields of the Reader module using the values below.
   a. **Data Source:** HiveQuery
   b. **Hive database query:** Use the following query.

```
select country, state, count(*) as
records from hivesampletable
group by country, state
order by records
desc limit 5
```

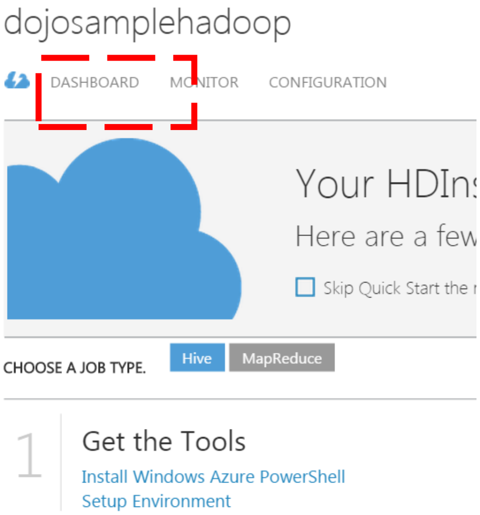


```
select country, state, count(*) as records
from hivesampletable
group by country, state
order by records
desc limit 5
```

   c. **HCatalog server URI:**
      i. Open this link in a new window or tab: https://manage.windowsazure.com/
      ii. Click HDInsight and then on your Hadoop cluster.



iii. Click on “Dashboard”.



dojosamplehadoop

Your HDIns

Here are a few

□ Skip Quick Start the r

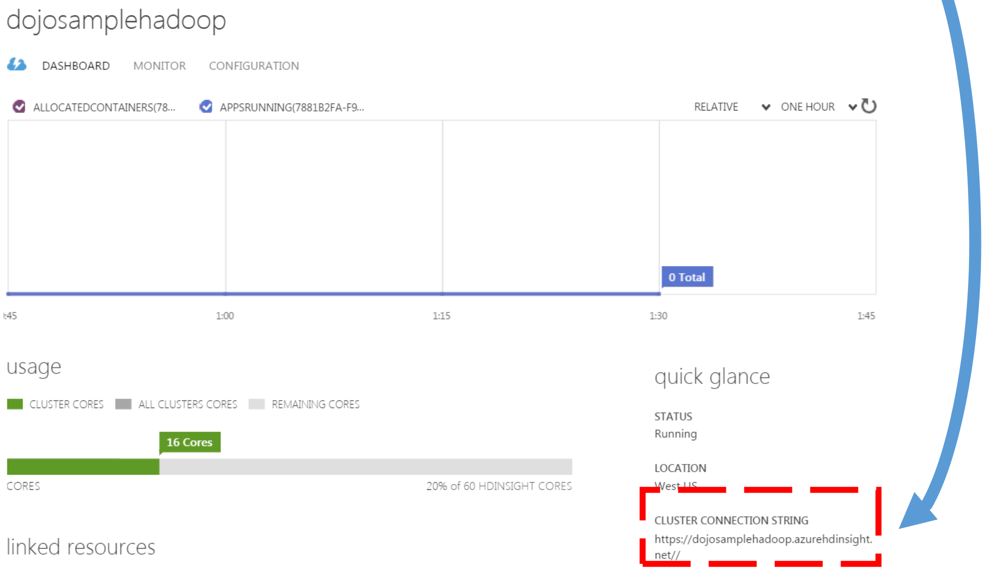
CHOOSE A JOB TYPE.

1 Get the Tools

Install Windows Azure PowerShell

Setup Environment

iv. Copy the cluster connection string located on the bottom-right corner of the dashboard screen.



dojosamplehadoop

usage

linked resources

quick glance

STATUS
Running

LOCATION
West US

CLUSTER CONNECTION STRING
https://dojosamplehadoop.azurehdinsight.net//

v. Return to Azure ML and paste the cluster connection string into the Reader module under **HCatalog server URI**.

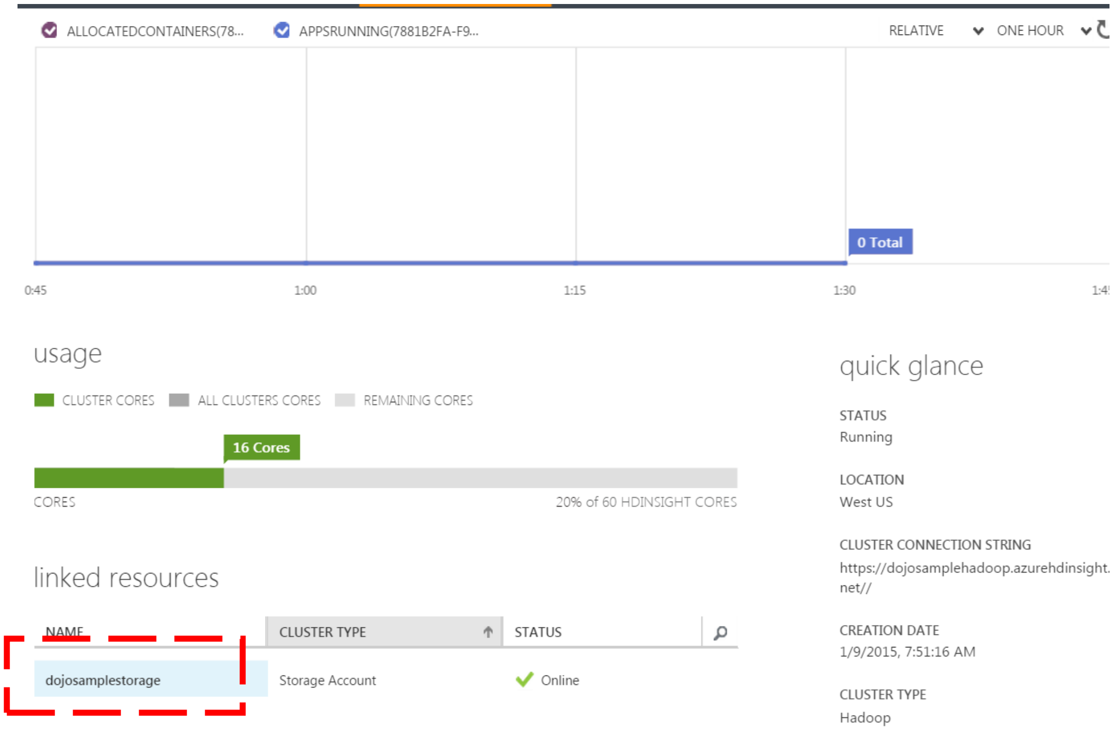
d. **Hadoop user account name:** admin

e. **Hadoop user account password:** The password you used for the HDInsight Hadoop cluster.

f. **Location of output data:** Azure

g. **Azure storage account name:**

i. Scroll down on the Hadoop cluster dashboard page. It will be under a table called “linked resources”.



usage

CORES 20% of 60 HDINSIGHT CORES

linked resources

NAME	CLUSTER TYPE	STATUS
dojosamplestorage	Storage Account	✓ Online

quick glance

STATUS
Running

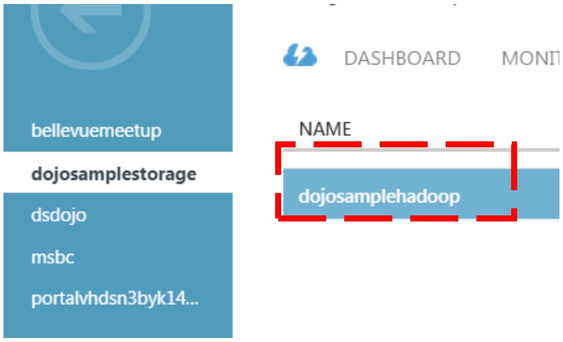
LOCATION
West US

CLUSTER CONNECTION STRING
https://dojosamplehadoop.azurehdinsight.net//

CREATION DATE
1/9/2015, 7:51:16 AM

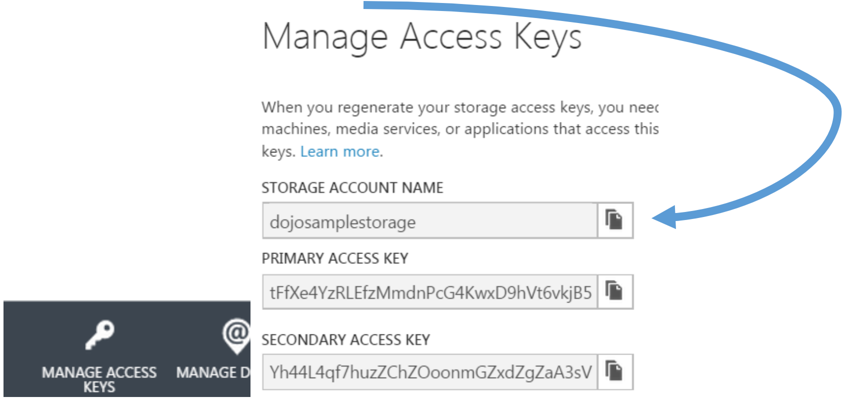
CLUSTER TYPE
Hadoop

ii. Click on the cluster name. Then click “Dashboard”.



NAME
dojosamplehadoop

iii. Click on "manage access keys" located in the bottom tool bar. Then, click the copy button to the right of the input box.



Manage Access Keys

When you regenerate your storage access keys, you neec machines, media services, or applications that access this keys. Learn more.

STORAGE ACCOUNT NAME: dojosamplestorage

PRIMARY ACCESS KEY: tFfXe4YzRLEfzMmdnPcG4KwxD9hVt6vkjB5

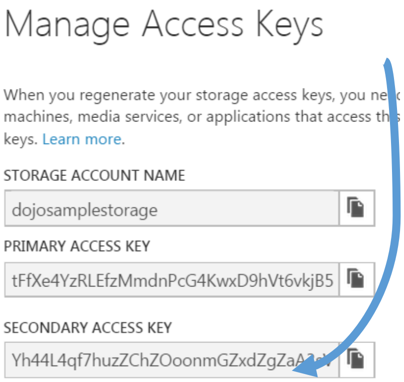
SECONDARY ACCESS KEY: Yh44L4qf7huzZChZOoonmGZxdZgZaA3sV

iv. Paste the storage name into the Reader module.

h. **Azure storage key:**

i. Copy either of the access key given in the "Manage Access Keys" popup.

1. The primary access key is the key used for important web services
2. The secondary key is for others, such as clients, and can be regenerated often.



Manage Access Keys

When you regenerate your storage access keys, you nee machines, media services, or applications that access th keys. Learn more.

STORAGE ACCOUNT NAME: dojosamplestorage

PRIMARY ACCESS KEY: tFfXe4YzRLEfzMmdnPcG4KwxD9hVt6vkjB5

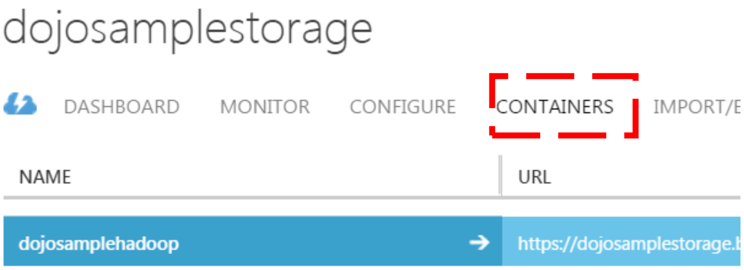
SECONDARY ACCESS KEY: Yh44L4qf7huzZChZOoonmGZxdZgZaA3sV

ii. Paste the storage key into the Reader module.

i. **Azure container name:**

i. Click on "containers" and copy the text under name.

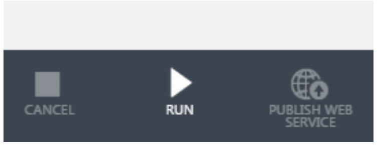
1. It should be the same name as your Hadoop cluster.



dojosamplestorage

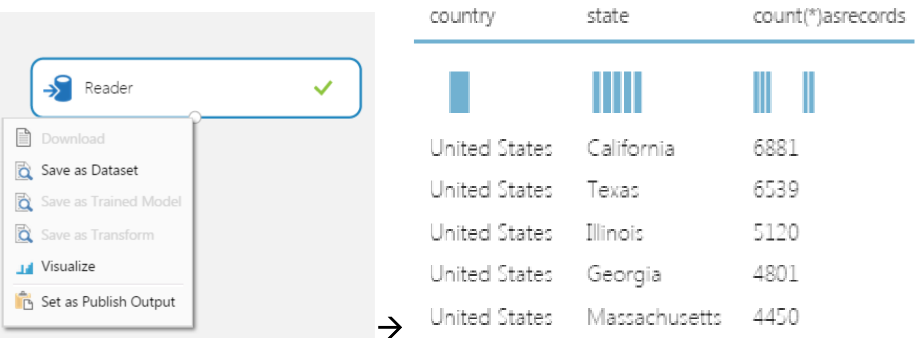
NAME	URL
dojosamplehadoop	https://dojosamplestorage.b

3. Run the experiment.



   a. Occasionally on Azure, Hadoop clusters are corrupted on creation. This will result in an “Error 0068” for any valid Hive query. If this happens, create a new Hadoop cluster and start the lab over.

4. Right click the bottom node of the Reader module and select visualize to see the output from the Hive query.

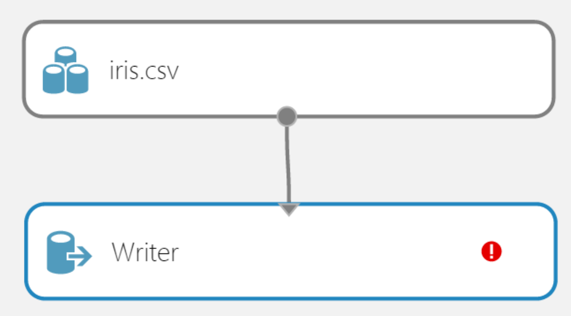


country	state	count(*)asrecords
United States	California	6881
United States	Texas	6539
United States	Illinois	5120
United States	Georgia	4801
United States	Massachusetts	4450

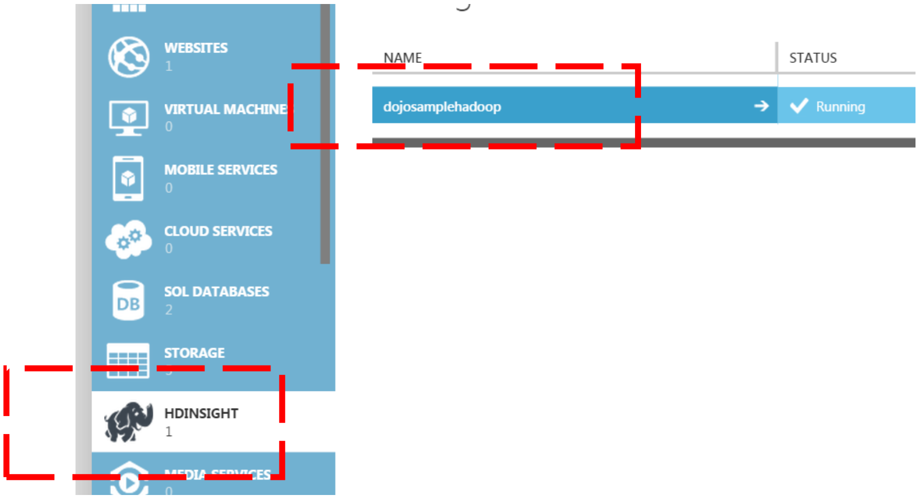
   a. To save the output, select “Save as Dataset” in the Reader’s output node.

Exercise 2: Writing and Creating a Hive Table Using Azure ML

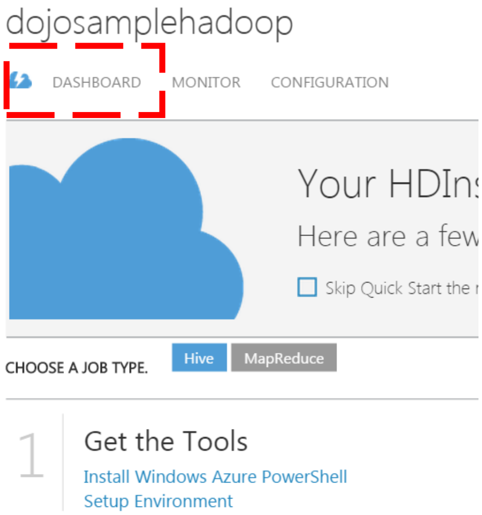
1. Drag in any dataset that you may want to be written to your Hadoop cluster as a Hive Table.
2. Then drag in a writer module and connect the dataset to writer module.



3. Populate the required fields of the Writer module using the values below.
   a. **Please specify data destination**: Set to "Hive Query".
   b. **Hive Table Name**: iris
      i. This will be the name of the table containing the uploaded data set and will be used in queries, i.e. SELECT * FROM iris.
   c. **HCatalog server URI:**
      i. Open this link in a new window or tab: https://manage.windowsazure.com/
      ii. Click HDInsight and then on your Hadoop cluster.



iii. Click on “Dashboard”.



Your HDIns

Here are a few

□ Skip Quick Start the

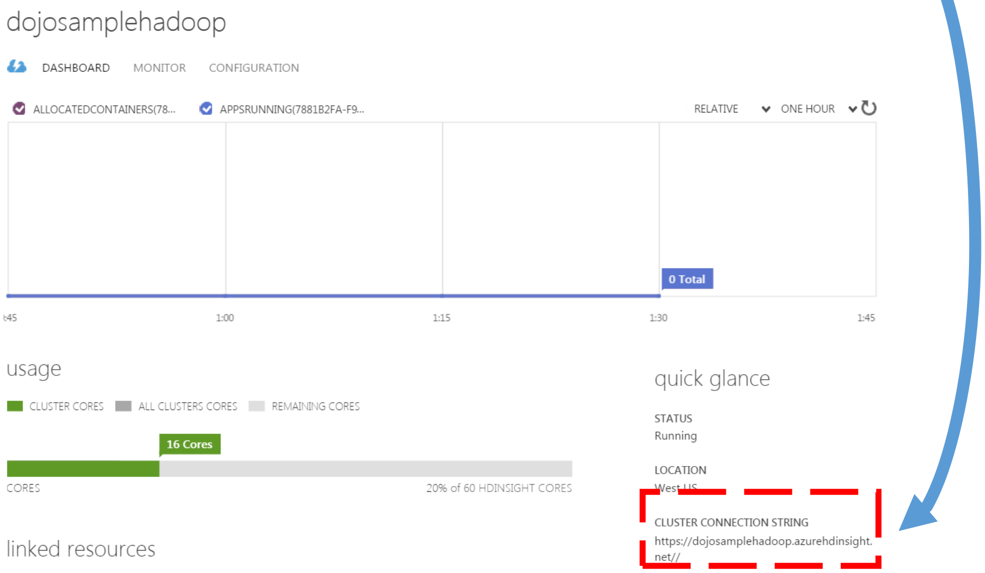
CHOOSE A JOB TYPE. Hive MapReduce

1 Get the Tools

Install Windows Azure PowerShell

Setup Environment

iv. Copy the cluster connection string located on the bottom-right corner of the dashboard screen.



STATUS
Running

LOCATION
West US

CLUSTER CONNECTION STRING
https://dojosamplehadoop.azurehdinsight.net//

v. Return to Azure ML and paste the cluster connection string into the Reader module under **HCatalog server URI**.

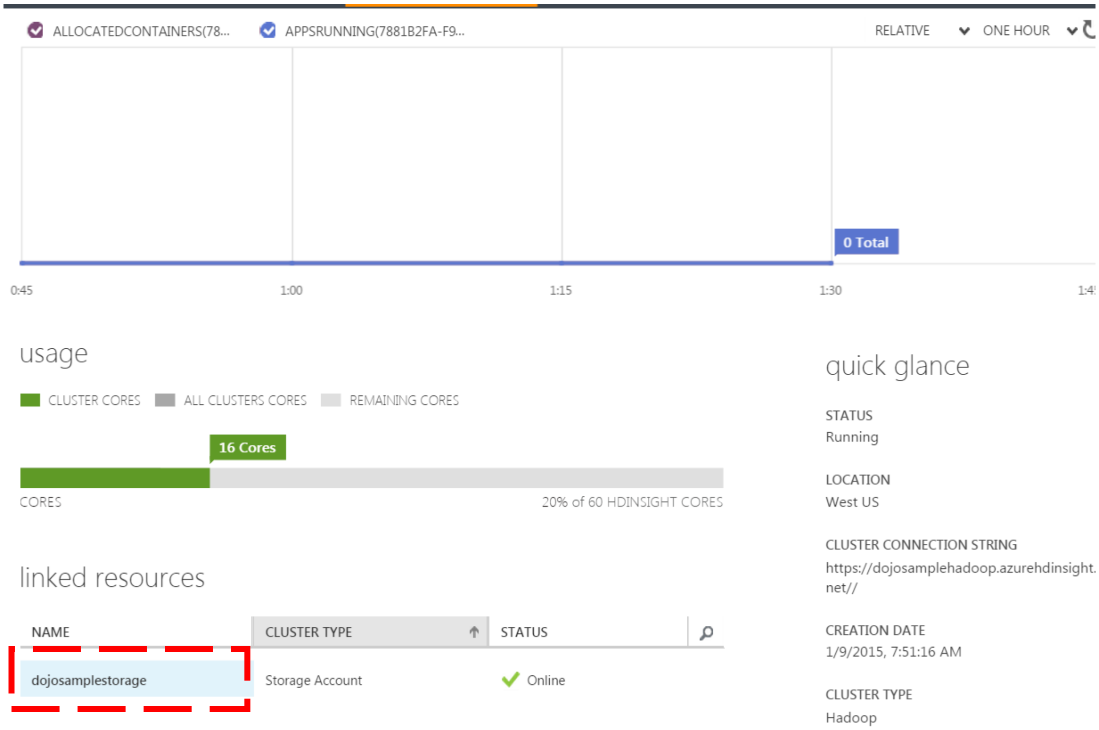
d. **Hadoop user account name:** admin

e. **Hadoop user account password:** The password you used for the HDInsight Hadoop cluster.

f. **Location of output data:** Azure

g. **Azure storage account name:**

i. Scroll down on the Hadoop cluster dashboard page. It will be under a table called “linked resources”.



usage

🟩 CLUSTER CORES ▨ ALL CLUSTERS CORES □ REMAINING CORES

16 Cores

CORES 20% of 60 HDINSIGHT CORES

linked resources

NAME	CLUSTER TYPE	STATUS
dojosamplestorage	Storage Account	✓ Online

quick glance

STATUS
Running

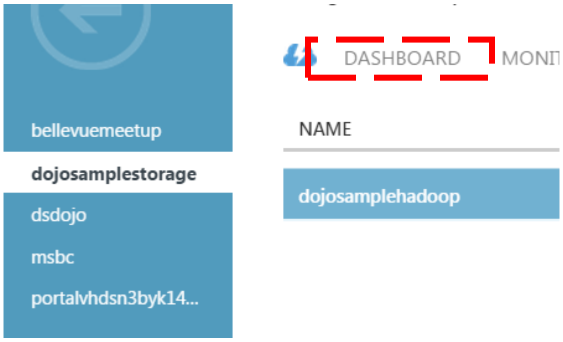
LOCATION
West US

CLUSTER CONNECTION STRING
https://dojosamplehadoop.azurehdinsight.net//

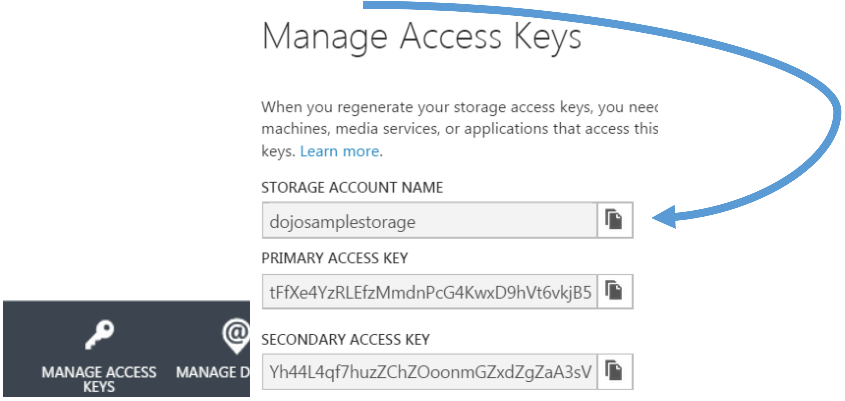
CREATION DATE
1/9/2015, 7:51:16 AM

CLUSTER TYPE
Hadoop

ii. Click on the cluster name. Then click “Dashboard”.



iii. Click on "manage access keys" located in the bottom tool bar. Then, click the copy button to the right of the input box.



Manage Access Keys

When you regenerate your storage access keys, you neec
machines, media services, or applications that access this
keys. Learn more.

STORAGE ACCOUNT NAME

dojosamplestorage

PRIMARY ACCESS KEY

tFfXe4YzRLEfzMmdnPcG4KwxD9hVt6vkjB5

SECONDARY ACCESS KEY

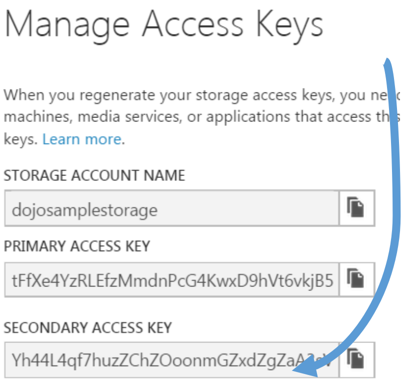
Yh44L4qf7huzZChZOoonmGZxdZgZaA3sV

iv. Paste the storage name into the Writer module.

h. **Azure storage key:**

i. Copy either of the access key given in the "Manage Access Keys" popup.

1. The primary access key is the key used for important web services
2. The secondary key is for others, such as clients, and can be regenerated often.



Manage Access Keys

When you regenerate your storage access keys, you ne
machines, media services, or applications that access th
keys. Learn more.

STORAGE ACCOUNT NAME

dojosamplestorage

PRIMARY ACCESS KEY

tFfXe4YzRLEfzMmdnPcG4KwxD9hVt6vkjB5

SECONDARY ACCESS KEY

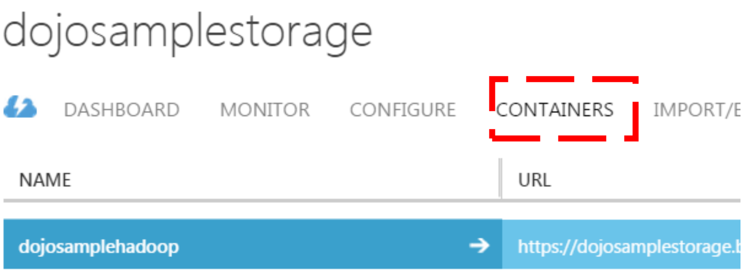
Yh44L4qf7huzZChZOoonmGZxdZgZaA3sV

ii. Paste the storage key into the Writer module

i. **Azure Container:**

i. Click on "containers" and copy the text under name.

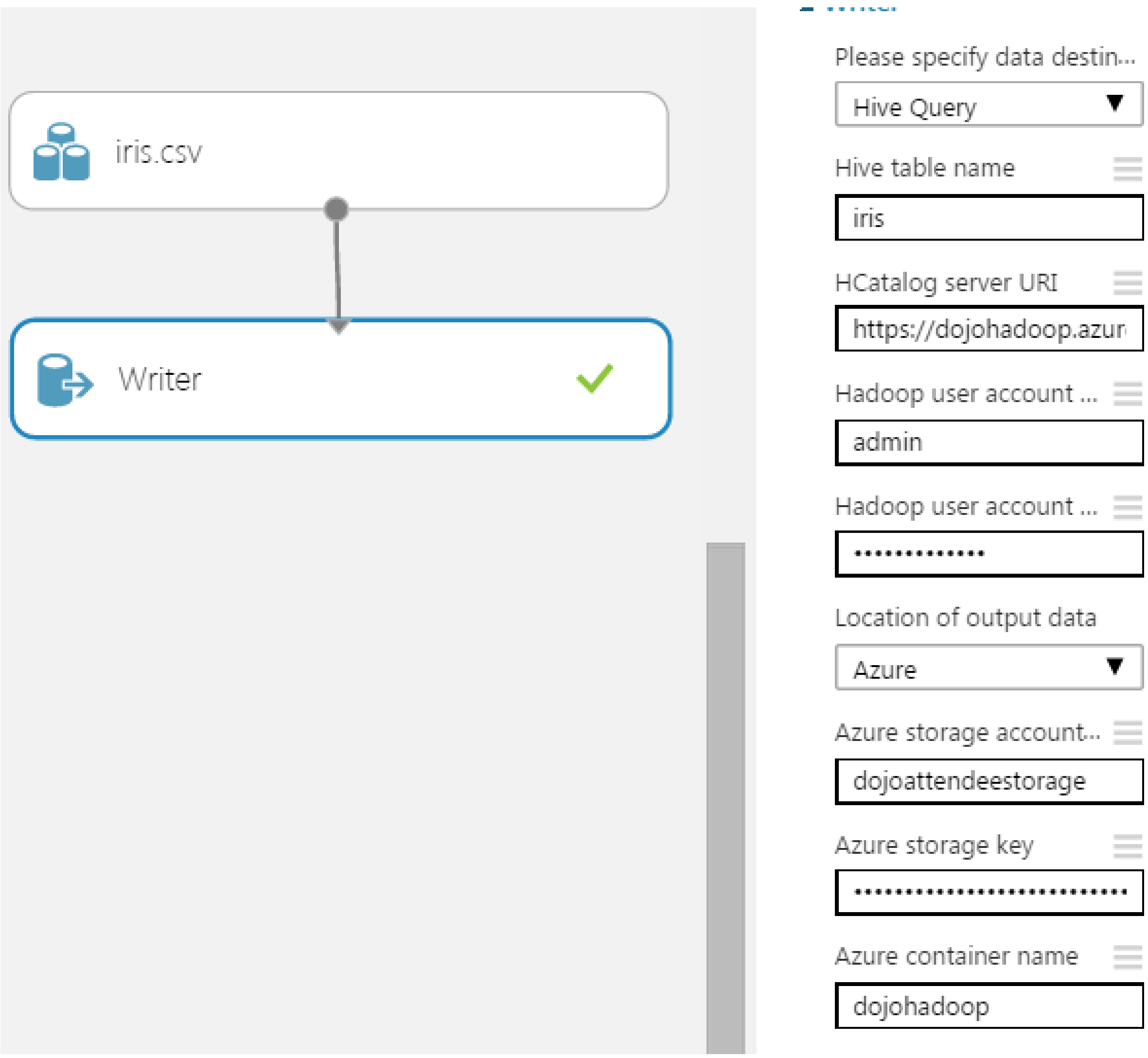
1. It should be the same name as your Hadoop cluster.



dojosamplestorage

NAME	URL
dojosamplehadoop →	https://dojosamplestorage.l

j. This is a sample of the completed Writer module.



Please specify data destin...
Hive Query

Hive table name
iris

HCatalog server URI
https://dojohadoop.azur

Hadoop user account ...
admin

Hadoop user account ...
••••••••••••••

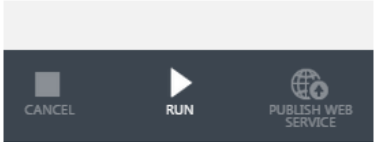
Location of output data
Azure

Azure storage account...
dojoattendeestorage

Azure storage key
•••••••••••••••••••••••••••••

Azure container name
dojohadoop

4. Run the experiment.



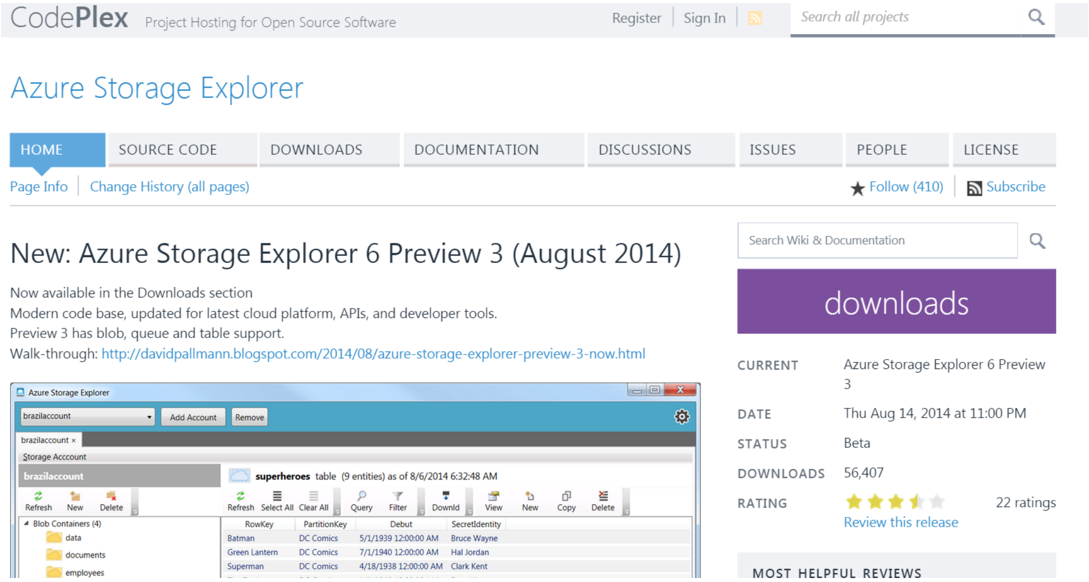
Lab 4: Loading Hive Tables from Azure Blob

Hive tables are not permanently persistent entities since Hadoop is meant to be temporary. As a result each Hadoop cluster must be referenced to a Blob Storage for data persistence. That way when the cluster is killed, the data will live on in the Blob Storage. As a result the referenced Blob storage is treated like a local directory for the Hadoop cluster. This lab will explorer the Blob/HDInsight relationship by reading a dataset from the storage.

Exercise 1: Uploading Data to a Blob Storage Using Azure Storage Explorer

In order to read data from the blob storage, it first must be uploaded to the blob. To do this we will utilize an application called Azure Storage Explorer.

1. Get the data
    a. Visit the following link to get the three-class iris data set. https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data
    b. Save the dataset to your desktop as a CSV file.
2. Install Azure Storage Explorer
    a. Download Azure Storage Explorer from http://azurestorageexplorer.codeplex.com/



CodePlex Project Hosting for Open Source Software
Register | Sign In
Search all projects
HOME
SOURCE CODE
DOWNLOADS
DOCUMENTATION
DISCUSSIONS
ISSUES
PEOPLE
LICENSE
Page Info | Change History (all pages)
★ Follow (410) | Subscribe
Search Wiki & Documentation
downloads
MOST HELPFUL REVIEWS

Azure Storage Explorer

New: Azure Storage Explorer 6 Preview 3 (August 2014)

Now available in the Downloads section
Modern code base, updated for latest cloud platform, APIs, and developer tools.
Preview 3 has blob, queue and table support.
Walk-through: http://davidpallmann.blogspot.com/2014/08/azure-storage-explorer-preview-3-now.html

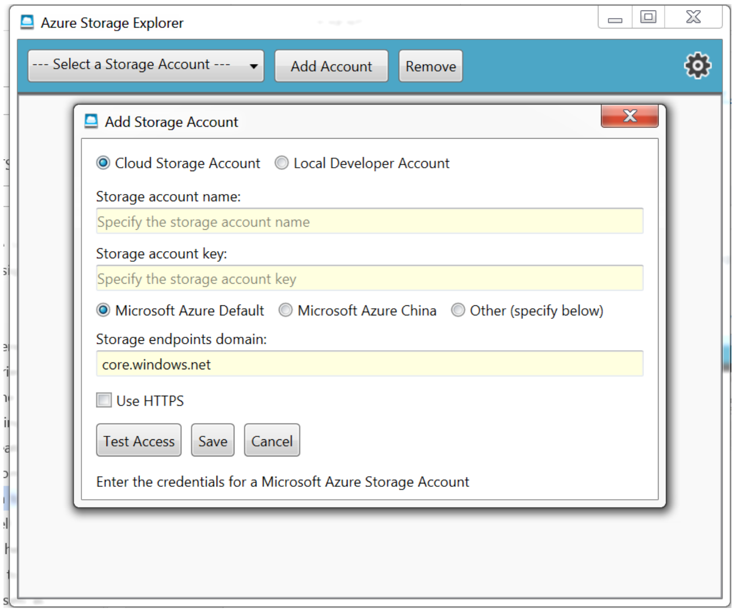
superheroes table (9 entities) as of 8/6/2014 6:32:48 AM

RowKey	PartitionKey	Debut	SecretIdentity
Batman	DC Comics	5/1/1939 12:00:00 AM	Bruce Wayne
Green Lantern	DC Comics	7/1/1940 12:00:00 AM	Hal Jordan
Superman	DC Comics	4/18/1938 12:00:00 AM	Clark Kent

CURRENT	Azure Storage Explorer 6 Preview 3
DATE	Thu Aug 14, 2014 at 11:00 PM
STATUS	Beta
DOWNLOADS	56,407
RATING	★★★★☆ 22 ratings Review this release

    b. Unzip and install Azure Storage Explorer

3. Log onto your blob storage.
    a. Launch Azure Storage Explorer
    b. Click on “add account”



Add Storage Account

● Cloud Storage Account ○ Local Developer Account

Storage account name:
Specify the storage account name

Storage account key:
Specify the storage account key

● Microsoft Azure Default ○ Microsoft Azure China ○ Other (specify below)

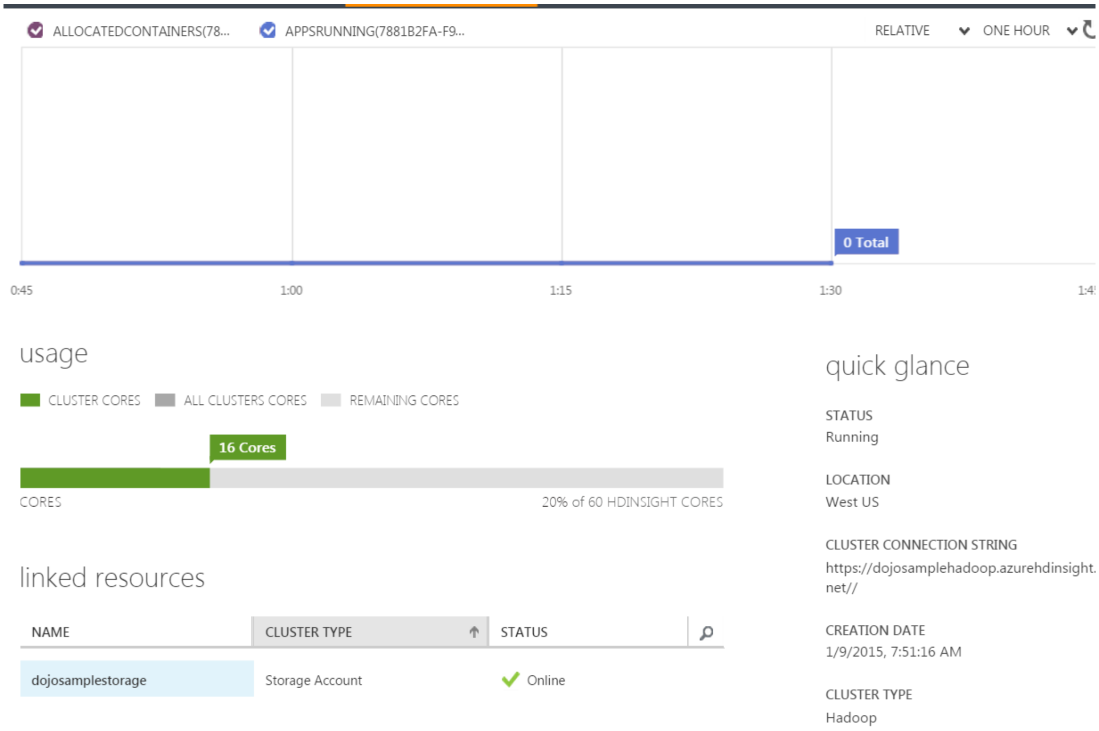
Storage endpoints domain:
core.windows.net

□ Use HTTPS

Test Access | Save | Cancel

Enter the credentials for a Microsoft Azure Storage Account

4. Fill in the credentials:
    a. Select **Cloud Storage Account**
    b. **Azure storage account name:**
        i. Scroll down on the Hadoop cluster dashboard page. It will be under a table called “linked resources”.



usage

🟩 CLUSTER CORES ▨ ALL CLUSTERS CORES □ REMAINING CORES

16 Cores

CORES — 20% of 60 HDINSIGHT CORES

linked resources

NAME	CLUSTER TYPE	STATUS
dojosamplestorage	Storage Account	✓ Online

quick glance

STATUS
Running

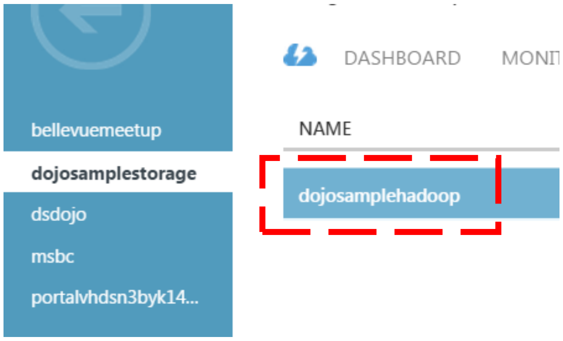
LOCATION
West US

CLUSTER CONNECTION STRING
https://dojosamplehadoop.azurehdinsight.net//

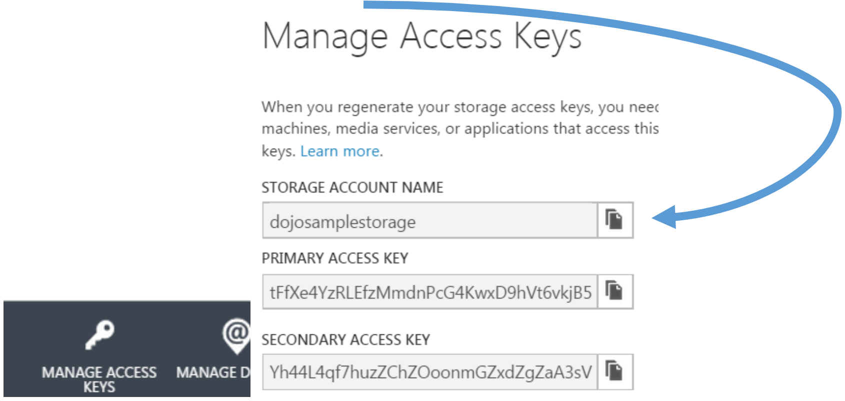
CREATION DATE
1/9/2015, 7:51:16 AM

CLUSTER TYPE
Hadoop

ii. Click on the cluster name. Then click “Dashboard”.



iii. Click on “manage access keys” located in the bottom tool bar. Then, click the copy button to the right of the input box.



Manage Access Keys

When you regenerate your storage access keys, you neec machines, media services, or applications that access this keys. Learn more.

STORAGE ACCOUNT NAME

dojosamplestorage

PRIMARY ACCESS KEY

tFfXe4YzRLEfzMmdnPcG4KwxD9hVt6vkjB5

SECONDARY ACCESS KEY

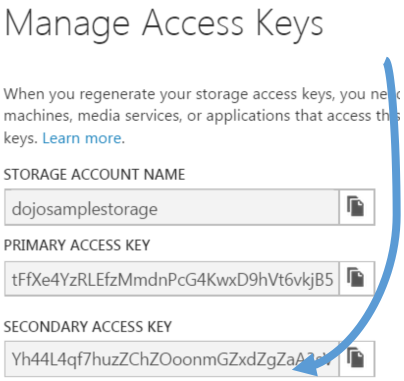
Yh44L4qf7huzZChZOoonmGZxdZgZaA3sV

iv. Paste the storage name into Azure Storage Explorer.

c. **Azure storage key:**

i. Copy either of the access key given in the “Manage Access Keys” popup.

1. The primary access key is the key used for important web services
2. The secondary key is for others, such as clients, and can be regenerated often.



Manage Access Keys

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STORAGE ACCOUNT NAME

dojosamplestorage

PRIMARY ACCESS KEY

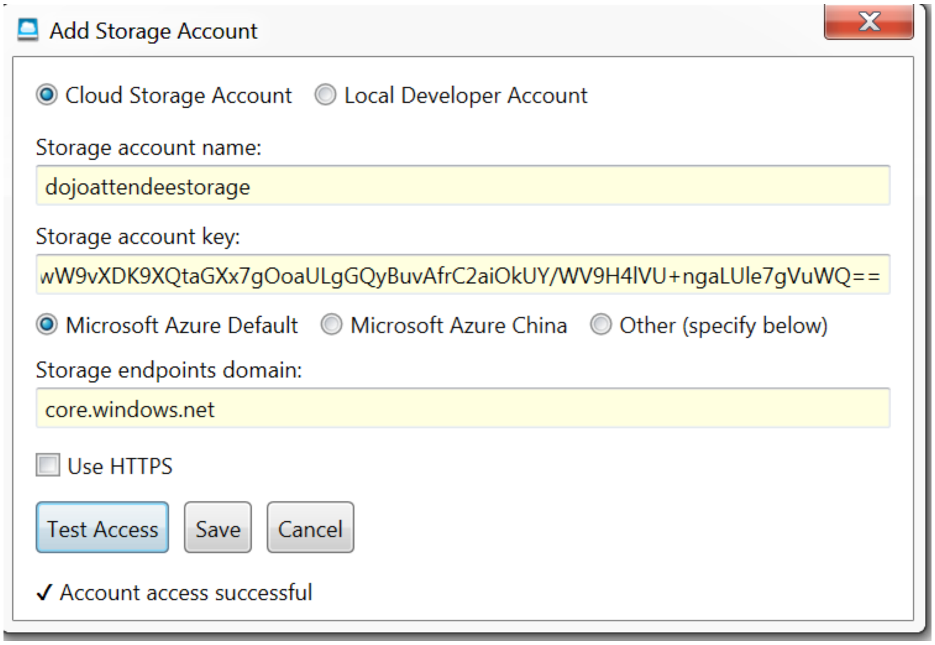
tFfXe4YzRLEfzMmdnPcG4KwxD9hVt6vkjB5

SECONDARY ACCESS KEY

Yh44L4qf7huzZChZOoonmGZxdZgZaA3sV

ii. Paste the Azure storage key into Azure Storage Explorer.

d. Test the access connection by clicking the “Test Access” button.



● Cloud Storage Account ○ Local Developer Account

Storage account name: dojoattendeestorage

Storage account key: wW9vXDK9XQtaGXx7gOoaULgGQyBuvAfrC2aiOkUY/WV9H4lVU+ngaLUle7gVuWQ==

● Microsoft Azure Default ○ Microsoft Azure China ○ Other (specify below)

Storage endpoints domain: core.windows.net

□ Use HTTPS

✓ Account access successful

e. Save the connection by hitting “save”.

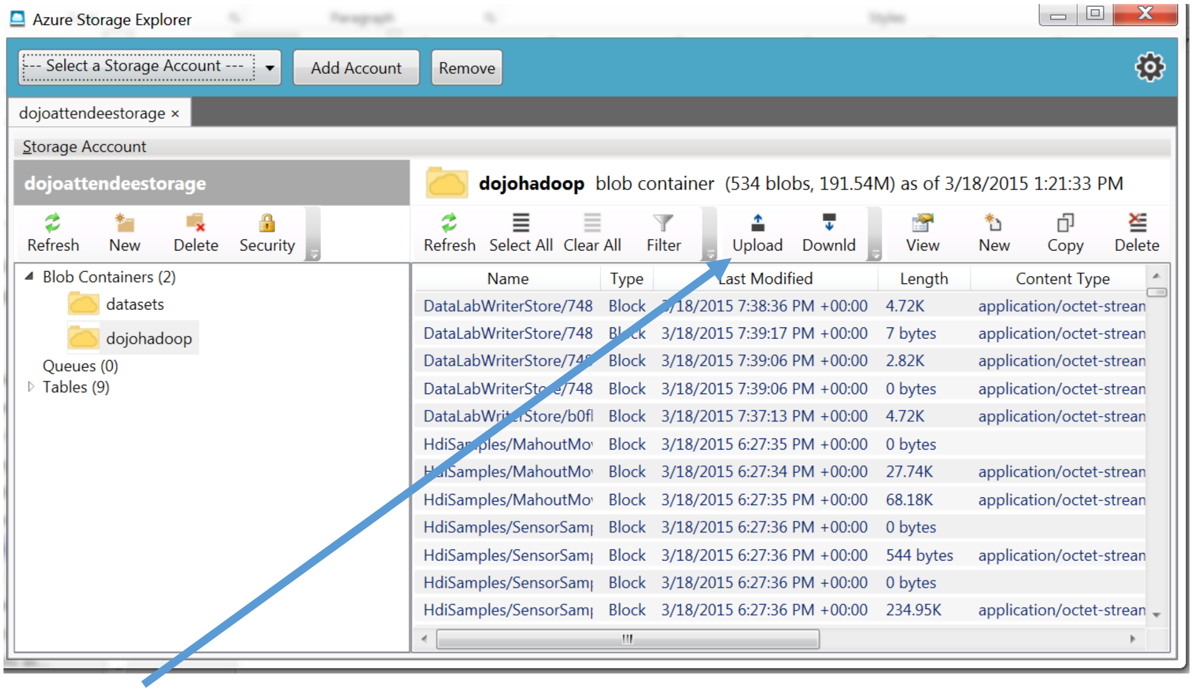
   i. A tab containing the blob storage directory will open.

5. Uploading File

   a. Click on the blob container that the Hadoop cluster is referencing.

      i. In the example below, our referenced container is “dojohadoop”.

      ii. Notice how it is completely populated with files related to the Hadoop cluster.

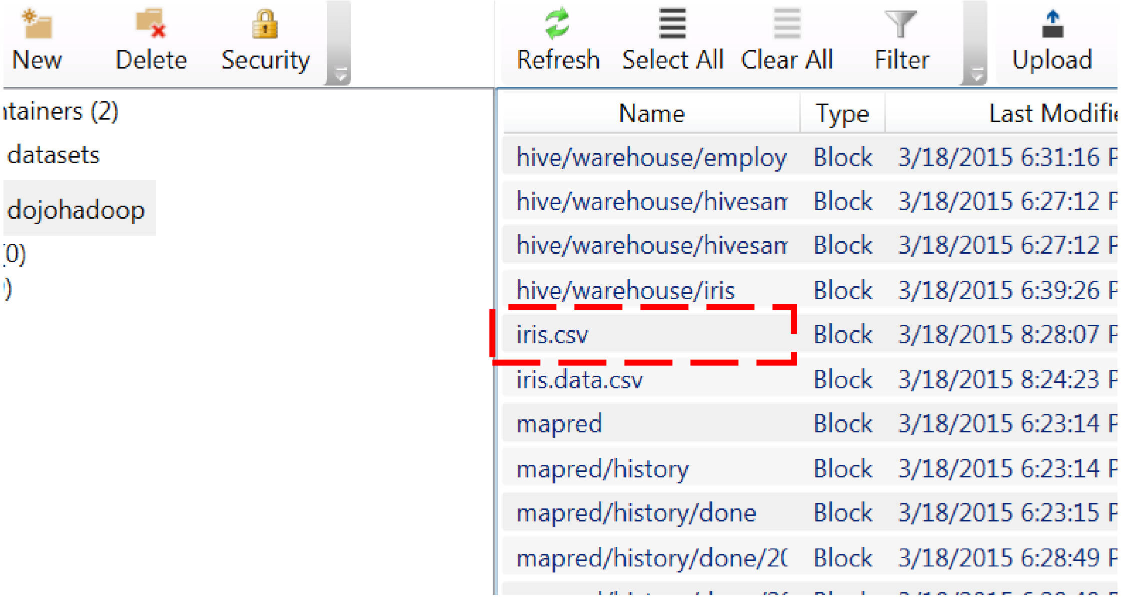


dojohadoop blob container (534 blobs, 191.54M) as of 3/18/2015 1:21:33 PM

Name	Type	Last Modified	Length	Content Type
DataLabWriterStore/748	Block	3/18/2015 7:38:36 PM +00:00	4.72K	application/octet-strean
DataLabWriterStore/748	Block	3/18/2015 7:39:17 PM +00:00	7 bytes	application/octet-strean
DataLabWriterStore/748	Block	3/18/2015 7:39:06 PM +00:00	2.82K	application/octet-strean
DataLabWriterStore/748	Block	3/18/2015 7:39:06 PM +00:00	0 bytes	application/octet-strean
DataLabWriterStore/b0fl	Block	3/18/2015 7:37:13 PM +00:00	4.72K	application/octet-strean
HdiSamples/MahoutMo	Block	3/18/2015 6:27:35 PM +00:00	0 bytes	
HdiSamples/MahoutMo	Block	3/18/2015 6:27:34 PM +00:00	27.74K	application/octet-strean
HdiSamples/MahoutMo	Block	3/18/2015 6:27:35 PM +00:00	68.18K	application/octet-strean
HdiSamples/SensorSam	Block	3/18/2015 6:27:36 PM +00:00	0 bytes	
HdiSamples/SensorSam	Block	3/18/2015 6:27:36 PM +00:00	544 bytes	application/octet-strean
HdiSamples/SensorSam	Block	3/18/2015 6:27:36 PM +00:00	0 bytes	
HdiSamples/SensorSam	Block	3/18/2015 6:27:36 PM +00:00	234.95K	application/octet-strean

   b. Hit the upload button and upload your iris csv file.

c. Confirm the upload by finding the file.

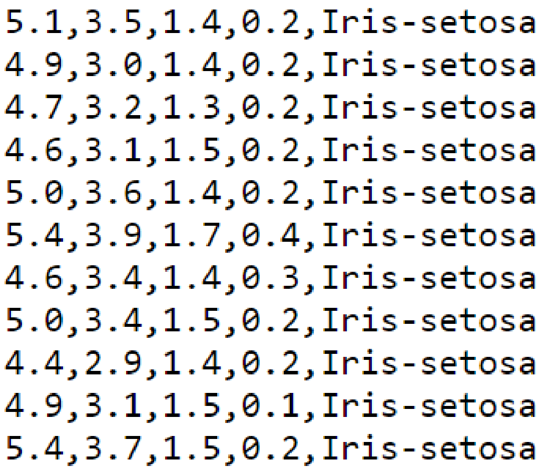


Name	Type	Last Modifi
hive/warehouse/employ	Block	3/18/2015 6:31:16 F
hive/warehouse/hivesam	Block	3/18/2015 6:27:12 F
hive/warehouse/hivesam	Block	3/18/2015 6:27:12 F
hive/warehouse/iris	Block	3/18/2015 6:39:26 F
iris.csv	Block	3/18/2015 8:28:07 F
iris.data.csv	Block	3/18/2015 8:24:23 F
mapred	Block	3/18/2015 6:23:14 F
mapred/history	Block	3/18/2015 6:23:14 F
mapred/history/done	Block	3/18/2015 6:23:15 F
mapred/history/done/2(	Block	3/18/2015 6:28:49 F

Exercise 2: Create A Hive Table using Query Console

Before loading the data into Hive from the blob, we must create a new blank hive table with the schemas defined.

1. Create a new table with a defined schema.
   a. Log into your Hadoop cluster's query console. Then go to your Hive Editor.
   b. We will now create a new table which our data will be uploaded into. This table will be blank, but the schema and storage will be provisioned. This will give our data structure when we populate it into Hadoop as a Hive table.
   c. Preview the Iris dataset from your local file.



```
5.1,3.5,1.4,0.2,Iris-setosa
4.9,3.0,1.4,0.2,Iris-setosa
4.7,3.2,1.3,0.2,Iris-setosa
4.6,3.1,1.5,0.2,Iris-setosa
5.0,3.6,1.4,0.2,Iris-setosa
5.4,3.9,1.7,0.4,Iris-setosa
4.6,3.4,1.4,0.3,Iris-setosa
5.0,3.4,1.5,0.2,Iris-setosa
4.4,2.9,1.4,0.2,Iris-setosa
4.9,3.1,1.5,0.1,Iris-setosa
5.4,3.7,1.5,0.2,Iris-setosa
```

      i. From the preview, we want the schema to accept FLOAT, FLOAT, FLOAT, FLOAT, STRING.

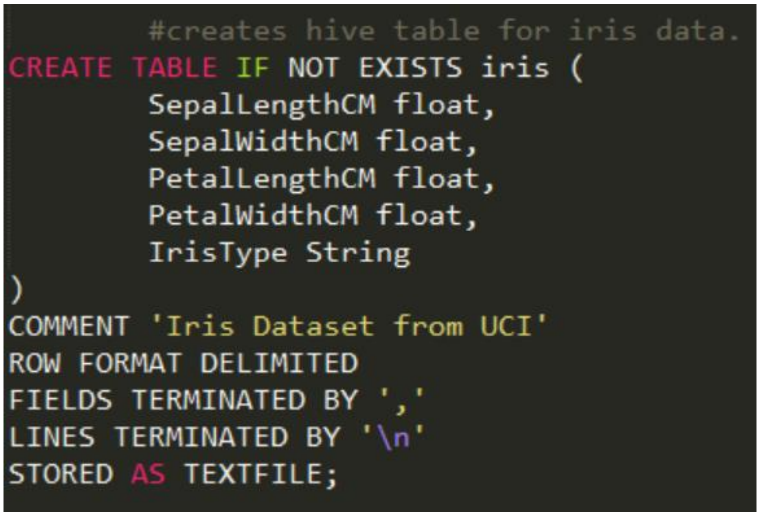
d. To find out what each column represents, visit: https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.names

   i. Go to #7 in the file, under "attribute information"

   ii. This is what we will name our columns.

e. Syntax: **create table myTableName(mySchema**). Copy the code below to create the table for the iris dataset.

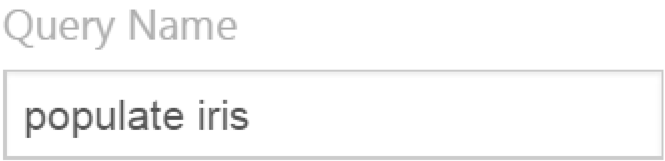
```
CREATE TABLE IF NOT EXISTS iris (
    SepalLengthCM float,
    SepalWidthCM float,
    PetalLengthCM float,
    PetalWidthCM float,
    IrisType String
)
COMMENT 'Iris Dataset from UCI'
ROW FORMAT DELIMITED
FIELDS TERMINATED BY ','
LINES TERMINATED BY '\n'
STORED AS TEXTFILE;
```



```
        #creates hive table for iris data.
CREATE TABLE IF NOT EXISTS iris (
        SepalLengthCM float,
        SepalWidthCM float,
        PetalLengthCM float,
        PetalWidthCM float,
        IrisType String
)
COMMENT 'Iris Dataset from UCI'
ROW FORMAT DELIMITED
FIELDS TERMINATED BY ','
LINES TERMINATED BY '\n'
STORED AS TEXTFILE;
```

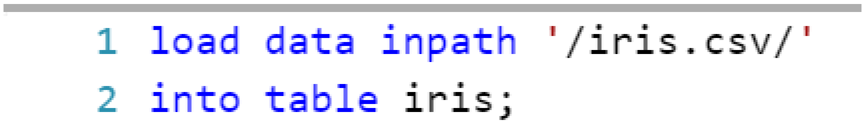
2. Execute "show tables" again to confirm if the table was created. Although the table shows up, it currently has no fields. We can now load data into this table.

3. Load data into the table from your Azure Blob storage.



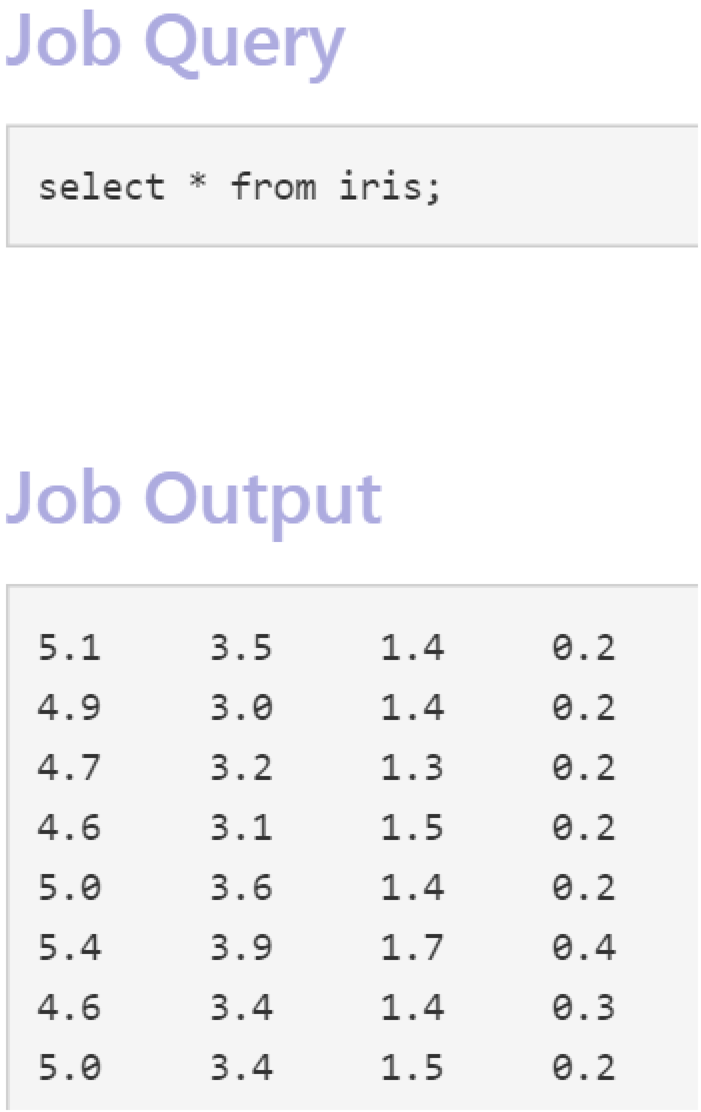
Query Name

populate iris



```
load data inpath '/iris.csv/'
into table iris;
```

   a. **LOAD DATA INPATH**, notice how the file path is simply /iris.csv. We did not have to specify which storage or which container because we already uploaded the file to the default location that the Hadoop cluster reads from.



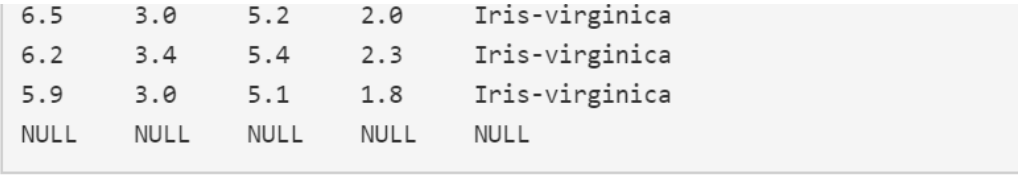
Job Query

```
select * from iris;
```

Job Output

```
5.1     3.5     1.4     0.2
4.9     3.0     1.4     0.2
4.7     3.2     1.3     0.2
4.6     3.1     1.5     0.2
5.0     3.6     1.4     0.2
5.4     3.9     1.7     0.4
4.6     3.4     1.4     0.3
5.0     3.4     1.5     0.2
```

2. Double Check
   a. Scroll to the bottom of the output. Notice how the last row is "null null null null null". It means that the original CSV we loaded in had an extra line that was empty at the end. Sadly there is actually no way to delete this row in HiveQL. You should not think about Hive as a regular RDBMS. Hive is better suited for batch processing over very large sets of immutable data. There is no operation supported for the deletion or update of a particular record.



```
6.5     3.0     5.2     2.0     Iris-virginica
6.2     3.4     5.4     2.3     Iris-virginica
5.9     3.0     5.1     1.8     Iris-virginica
NULL    NULL    NULL    NULL    NULL
```

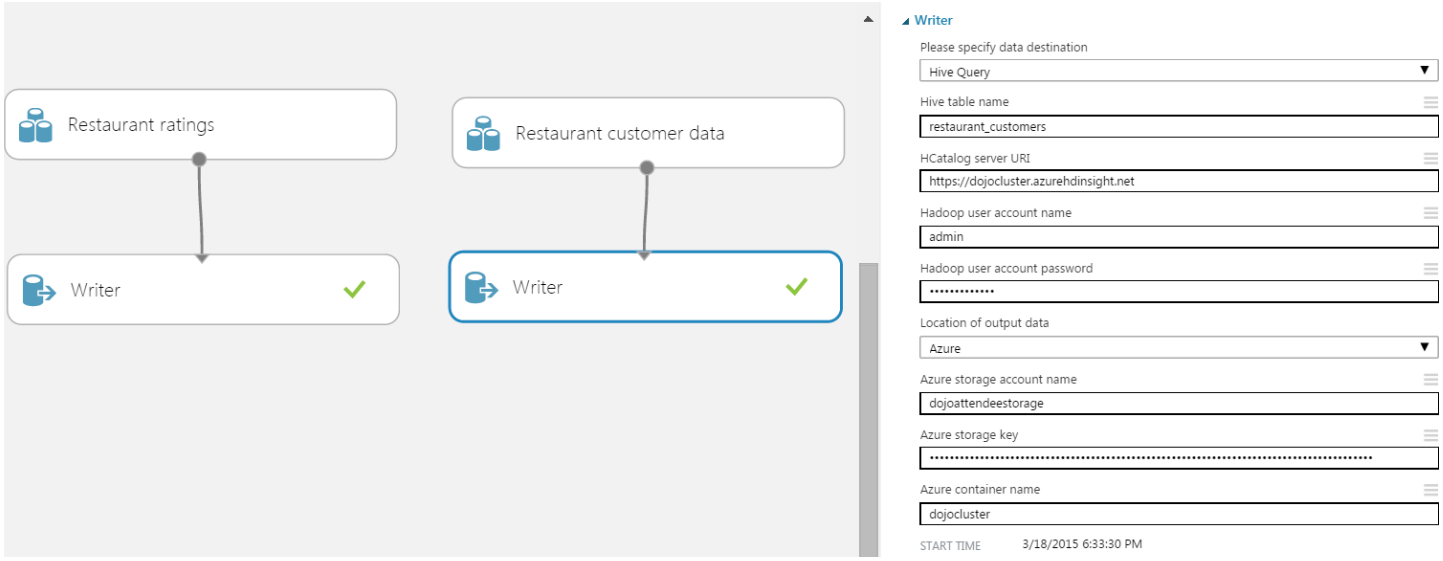
Lab 5: Joining Hive Tables

Hive lets you join hive tables. Though keep in mind that Hive tables are designed for data warehouses, where datasets are often de-normalized so that joins are not necessary. Ideally your data was already captured in a way so that hive joins are not necessary.

Exercise 1: Loading two tables to be joined.

We will be uploading two example datasets as Hive tables onto HDFS using Azure ML.

1. Navigate to a new Azure ML experiment.
2. For this lab, drag in the following two datasets: Restaurant ratings and Restaurant customer data.
3. Drag in a writer module and populate the Hive credentials into the writer module. Full directions on how to write datasets to Hadoop as a Hive table can be referenced from **Lab 3, Exercise 2**.
4. After the writer module's credentials have been populated, copy and paste the writer module. Be sure to set "Hive Table Name" differently for their respective datasets. Hive Table Name should also be a single string without spaces or special characters or else the tables will not be written to Hive HDFS. Spaces can be denoted with an underscore "table_name".



Writer

Please specify data destination: Hive Query

Hive table name: restaurant_customers

HCatalog server URI: https://dojocluster.azurehdinsight.net

Hadoop user account name: admin

Hadoop user account password: •••••••••••••

Location of output data: Azure

Azure storage account name: dojoattendeestorage

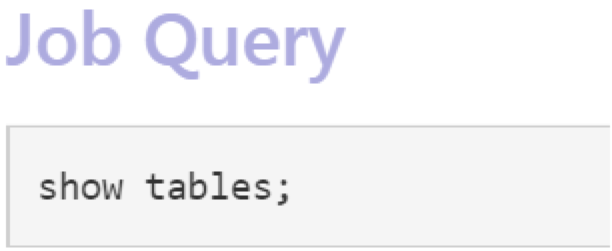
Azure storage key: ••

Azure container name: dojocluster

START TIME 3/18/2015 6:33:30 PM

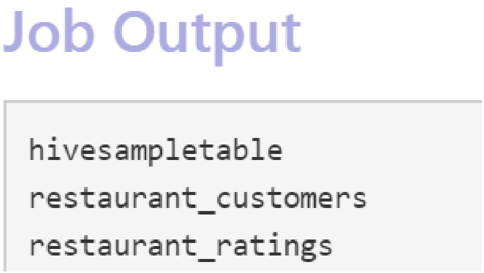
Exercise 2: HiveQL Join Using Query Console.

1. Navigate to the Hadoop cluster's query console.
2. Confirm the existence of the new tables by performing a "show tables;" query.



Job Query

```
show tables;
```

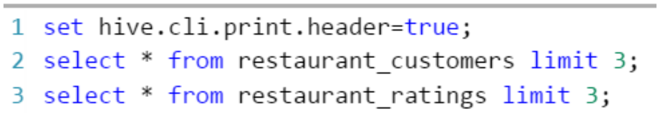


Job Output

```
hivesampletable
restaurant_customers
restaurant_ratings
```

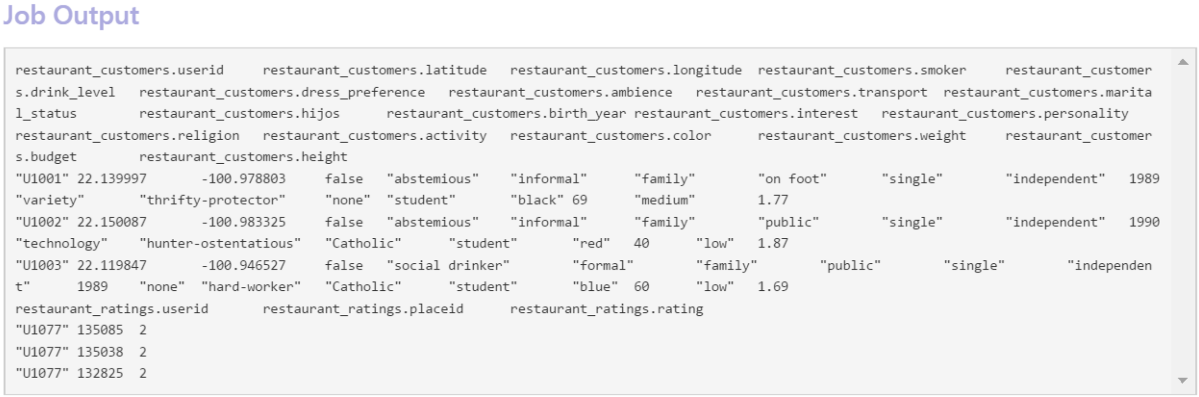
3. Preview both tables with the following statement:

```
set hive.cli.print.header=true;

select * from restaurant_customers limit 3;

select * from restaurant_ratings limit 3;
```



```
set hive.cli.print.header=true;
select * from restaurant_customers limit 3;
select * from restaurant_ratings limit 3;
```

   a. Notice how we are running 3 separate queries in a single hive job. Our results will be concatenated together, so look carefully when viewing the output.

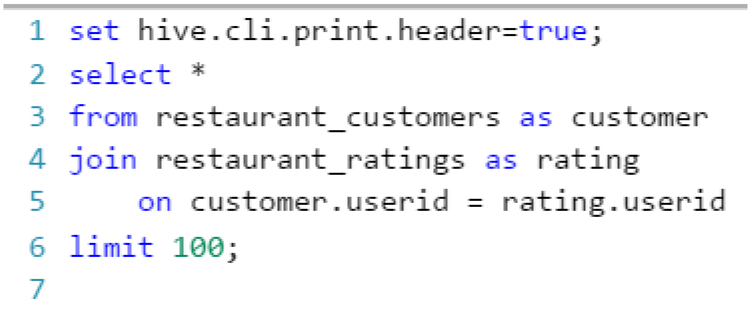


Job Output

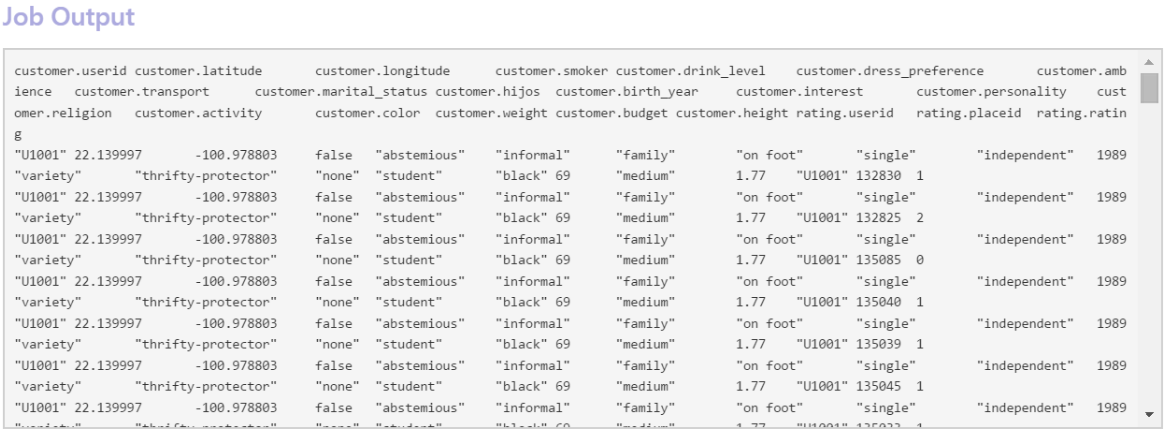
```
restaurant_customers.userid     restaurant_customers.latitude   restaurant_customers.longitude  restaurant_customers.smoker     restaurant_customer
s.drink_level   restaurant_customers.dress_preference   restaurant_customers.ambience   restaurant_customers.transport  restaurant_customers.marita
l_status        restaurant_customers.hijos      restaurant_customers.birth_year restaurant_customers.interest   restaurant_customers.personality
restaurant_customers.religion   restaurant_customers.activity   restaurant_customers.color      restaurant_customers.weight     restaurant_customer
s.budget        restaurant_customers.height
"U1001" 22.139997       -100.978803     false   "abstemious"    "informal"      "family"        "on foot"       "single"        "independent"   1989
"variety"       "thrifty-protector"     "none"  "student"       "black" 69      "medium"        1.77
"U1002" 22.150087       -100.983325     false   "abstemious"    "informal"      "family"        "public"        "single"        "independent"   1990
"technology"    "hunter-ostentatious"   "Catholic"      "student"       "red"   40      "low"   1.87
"U1003" 22.119847       -100.946527     false   "social drinker"        "formal"        "family"        "public"        "single"        "independen
t"      1989    "none"  "hard-worker"   "Catholic"      "student"       "blue"  60      "low"   1.69
restaurant_ratings.userid       restaurant_ratings.placeid      restaurant_ratings.rating
"U1077" 135085  2
"U1077" 135038  2
"U1077" 132825  2
```

   b. Notice that both tables have a userID. This is what we will join with.

4. Input the following code to join the tables on userid.



```
set hive.cli.print.header=true;
select *
from restaurant_customers as customer
join restaurant_ratings as rating
    on customer.userid = rating.userid
limit 100;
```



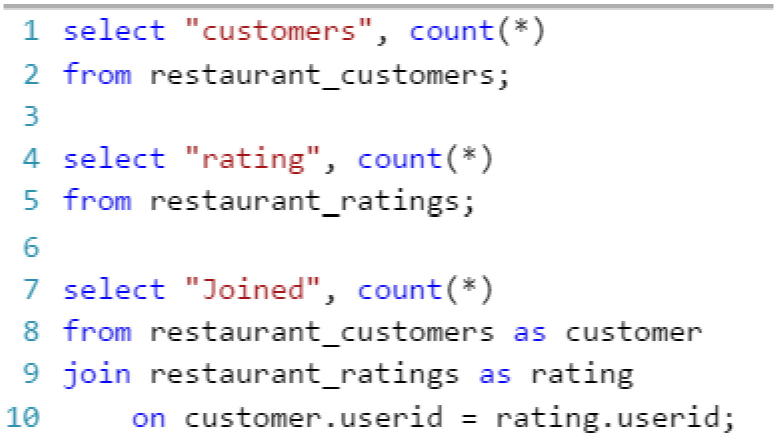
Job Output

```
customer.userid customer.latitude       customer.longitude      customer.smoker customer.drink_level    customer.dress_preference       customer.amb
ience   customer.transport      customer.marital_status customer.hijos  customer.birth_year     customer.interest       customer.personality    cust
omer.religion   customer.activity       customer.color  customer.weight customer.budget customer.height rating.userid   rating.placeid  rating.ratin
g
"U1001" 22.139997       -100.978803     false   "abstemious"    "informal"      "family"        "on foot"       "single"        "independent"   1989
"variety"       "thrifty-protector"     "none"  "student"       "black" 69      "medium"        1.77    "U1001" 132830  1
"U1001" 22.139997       -100.978803     false   "abstemious"    "informal"      "family"        "on foot"       "single"        "independent"   1989
"variety"       "thrifty-protector"     "none"  "student"       "black" 69      "medium"        1.77    "U1001" 132825  2
"U1001" 22.139997       -100.978803     false   "abstemious"    "informal"      "family"        "on foot"       "single"        "independent"   1989
"variety"       "thrifty-protector"     "none"  "student"       "black" 69      "medium"        1.77    "U1001" 135085  0
"U1001" 22.139997       -100.978803     false   "abstemious"    "informal"      "family"        "on foot"       "single"        "independent"   1989
"variety"       "thrifty-protector"     "none"  "student"       "black" 69      "medium"        1.77    "U1001" 135040  1
"U1001" 22.139997       -100.978803     false   "abstemious"    "informal"      "family"        "on foot"       "single"        "independent"   1989
"variety"       "thrifty-protector"     "none"  "student"       "black" 69      "medium"        1.77    "U1001" 135039  1
"U1001" 22.139997       -100.978803     false   "abstemious"    "informal"      "family"        "on foot"       "single"        "independent"   1989
"variety"       "thrifty-protector"     "none"  "student"       "black" 69      "medium"        1.77    "U1001" 135045  1
"U1001" 22.139997       -100.978803     false   "abstemious"    "informal"      "family"        "on foot"       "single"        "independent"   1989
```

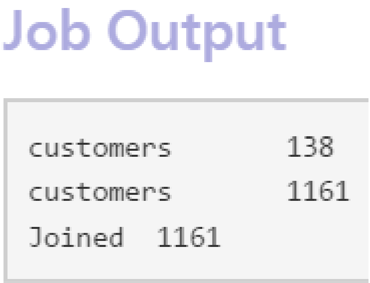
   a. Notice that we used the “AS” clause to create simple aliases for the tables. This makes the headers more readable. We also limited the query to only display the first 100. This is a good practice for previewing data.

Exercise 3: Join with Aggregation

1. Let's do a full count of all 3 tables: the customer table, the ratings table, and the combined join table.



```
select "customers", count(*)
from restaurant_customers;

select "rating", count(*)
from restaurant_ratings;

select "Joined", count(*)
from restaurant_customers as customer
join restaurant_ratings as rating
    on customer.userid = rating.userid;
```



Job Output

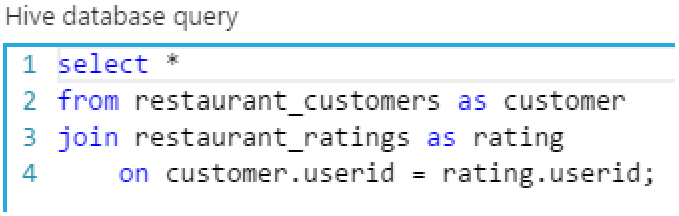
```
customers        138
customers        1161
Joined   1161
```

2. Some things to note:
   a. We are performing 3 queries in the same job.
   b. We purposely left out the headers so the tables would vertically concatenate for us.
   c. We explicitly added the word "Joined" to the output of the last query to give the table symmetry.

Exercise 4: Join Hive Tables in Azure Machine Learning Studio

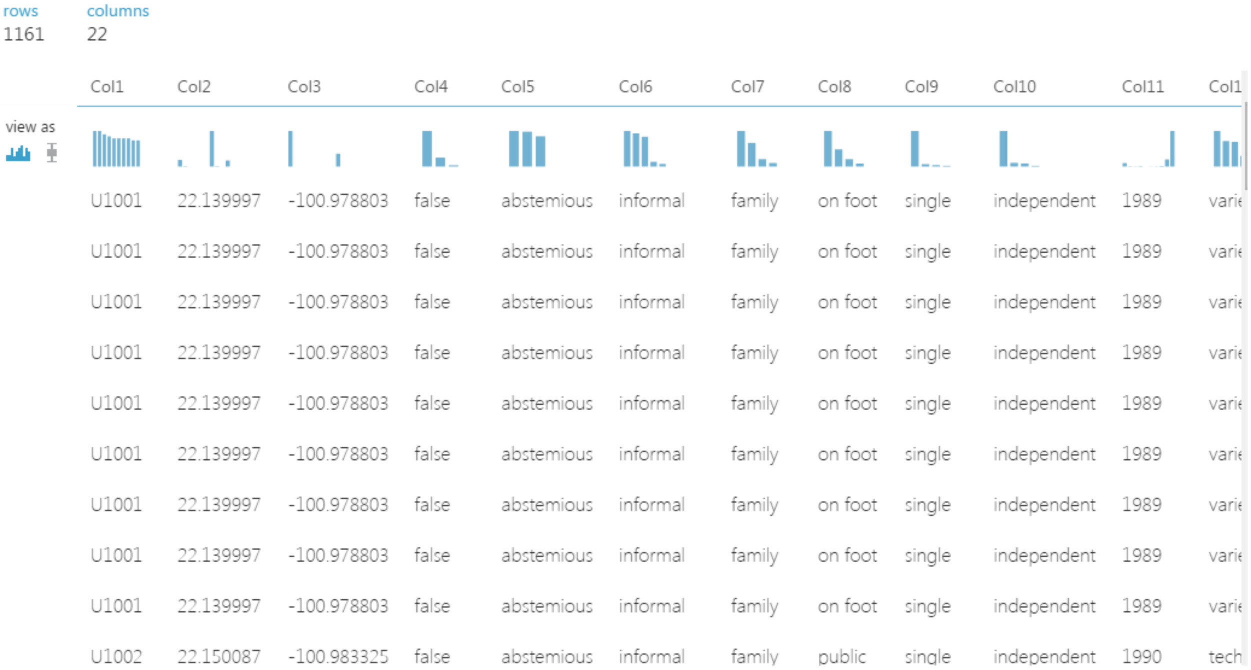
This dataset would be much easier to read if we were to populate it into Azure ML instead of the query console.

1. Create a new experiment in Azure ML.
2. Drag in a reader module.
3. For full directions on where to find the writer module's HiveQuery credentials, please refer to **Lab 3, Exercise 1**.
4. Insert the join query into the "hive database query" textbox.



Hive database query

```
select *
from restaurant_customers as customer
join restaurant_ratings as rating
    on customer.userid = rating.userid;
```



rows 1161

columns 22

Col1	Col2	Col3	Col4	Col5	Col6	Col7	Col8	Col9	Col10	Col11	Col1
U1001	22.139997	-100.978803	false	abstemious	informal	family	on foot	single	independent	1989	varie
U1001	22.139997	-100.978803	false	abstemious	informal	family	on foot	single	independent	1989	varie
U1001	22.139997	-100.978803	false	abstemious	informal	family	on foot	single	independent	1989	varie
U1001	22.139997	-100.978803	false	abstemious	informal	family	on foot	single	independent	1989	varie
U1001	22.139997	-100.978803	false	abstemious	informal	family	on foot	single	independent	1989	varie
U1001	22.139997	-100.978803	false	abstemious	informal	family	on foot	single	independent	1989	varie
U1001	22.139997	-100.978803	false	abstemious	informal	family	on foot	single	independent	1989	varie
U1001	22.139997	-100.978803	false	abstemious	informal	family	on foot	single	independent	1989	varie
U1001	22.139997	-100.978803	false	abstemious	informal	family	on foot	single	independent	1989	varie
U1002	22.150087	-100.983325	false	abstemious	informal	family	public	single	independent	1990	tech

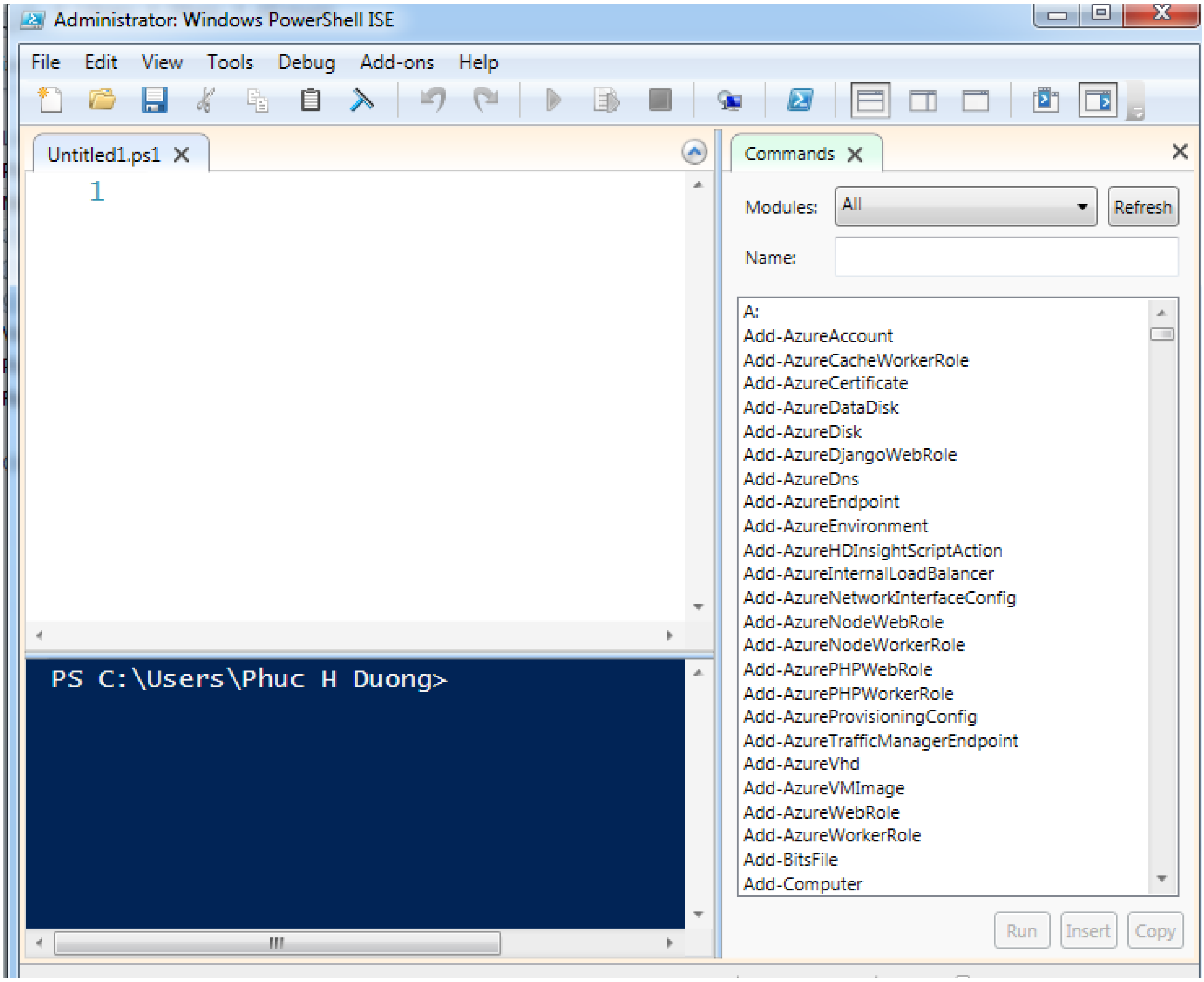
Extra Lab: Hive with Azure PowerShell

In this lab, you will find out how to use Hive beyond the query console. This lab will assume that you have completed the HDInsight & Hive lab.

Exercise 1: Intro to PowerShell

You can't go too long in the Azure ecosystem without encountering PowerShell with Azure SDK (systems development kit). In this exercise, we will upload a dataset to the Azure Blob Storage that our Hadoop cluster is referencing, so that our Hadoop cluster can start reading it.

1. Install PowerShell if you do not have it already. Search in your task bar to see if it exists. We will be using **PowerShell ISE**.
    a. Open PowerShell in **administrative mode.**

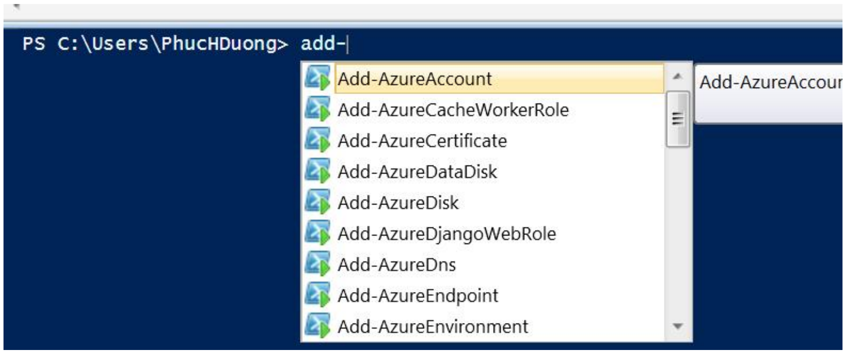


```
PS C:\Users\Phuc H Duong>
```

A:
Add-AzureAccount
Add-AzureCacheWorkerRole
Add-AzureCertificate
Add-AzureDataDisk
Add-AzureDisk
Add-AzureDjangoWebRole
Add-AzureDns
Add-AzureEndpoint
Add-AzureEnvironment
Add-AzureHDInsightScriptAction
Add-AzureInternalLoadBalancer
Add-AzureNetworkInterfaceConfig
Add-AzureNodeWebRole
Add-AzureNodeWorkerRole
Add-AzurePHPWebRole
Add-AzurePHPWorkerRole
Add-AzureProvisioningConfig
Add-AzureTrafficManagerEndpoint
Add-AzureVhd
Add-AzureVMImage
Add-AzureWebRole
Add-AzureWorkerRole
Add-BitsFile
Add-Computer

    b. Your PowerShell should look like the above picture. It has a top level for scripts and a bottom level (dark blue) for command line.

3. Checking if Azure PowerShell SDK is installed.
    a. Type in “**Add-**” into the PowerShell command line. If intellisense does not pop up, you need to install Azure PowerShell SDK under step 1-b-i. If intellisense does not appear after the install, restart your computer.



```
PS C:\Users\PhucHDuong> add-
```

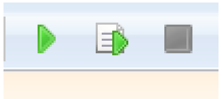
    b. Download Azure PowerShell SDK (if you don’t have it installed): http://azure.microsoft.com/en-us/downloads/
    c. Under Windows ‘PowerShell’
4. Load your Azure Subscription
    a. Method: automatic authentication
    b. Type in **Add-AzureAccount**. It will open a web browser to log into your Azure account with a 12 hour instance. If this step errors, please refer to “Appendix & Alternative Methods” for an alternative method (last exercise of this lab).

Exercise 2: Uploading Files to the Blob Storage

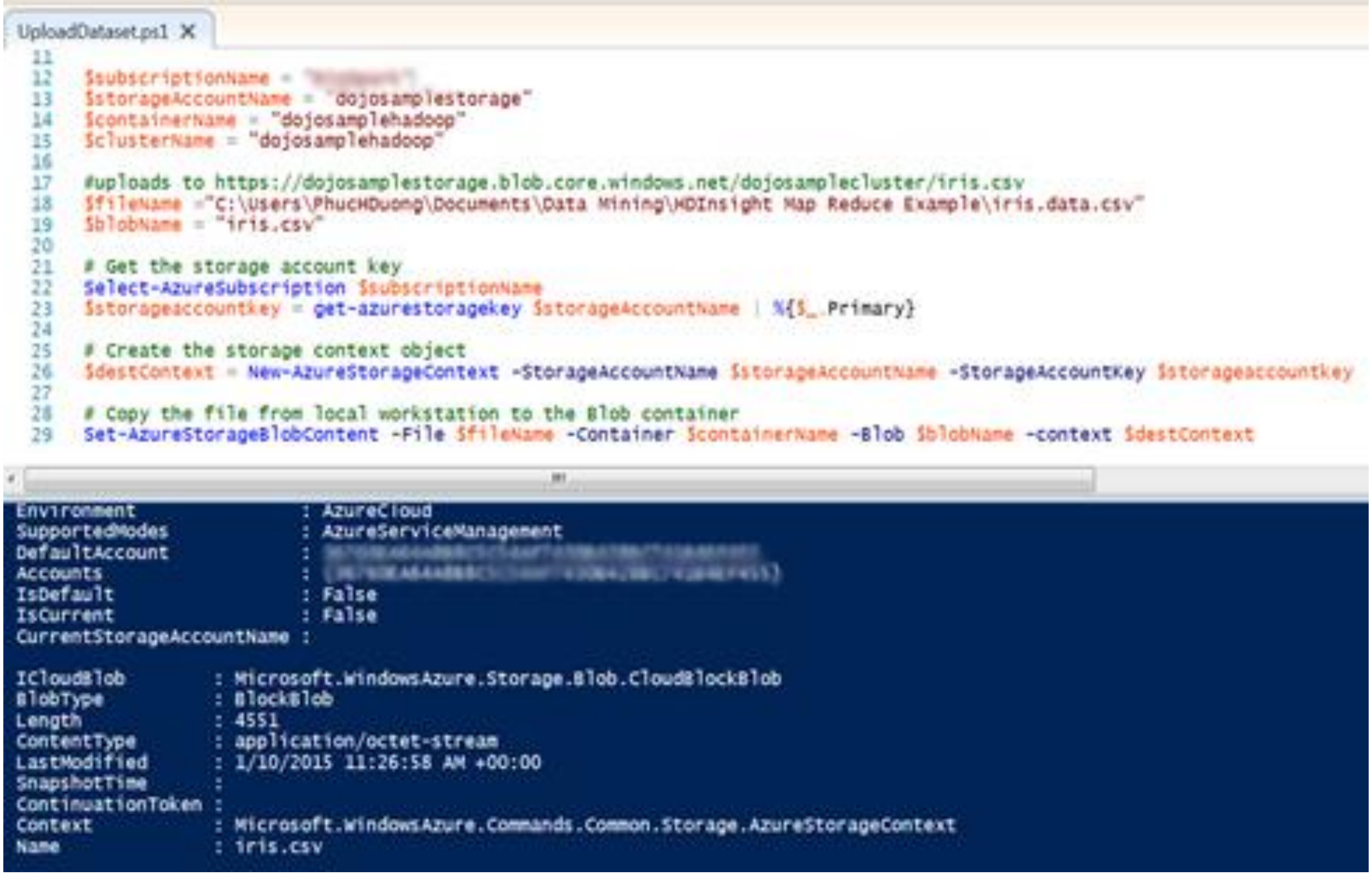
1. Get the data
   a. We will be working with the Iris dataset. Specifically the 3 class dataset. Visit the following link. Download and view the data https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data
   b. Save the dataset to your desktop as a CSV file.
2. Below is a sample script. Paste it into the script section of your PowerShell ISE window. We will need to change a few details.

```
$subscriptionName = "mySubscriptionName"
$storageAccountName = "dojosamplestorage"
$containerName = "dojosamplehadoopcluster"
$clusterName = "dojosamplehadoopcluster"

#uploads to https://dojosamplestorage.blob.core.windows.net/dojosamplecluster/iris.csv
$fileName ="C:\Users\Bruce Wayne\Desktop\iris-multi.csv"
$blobName = "iris.csv"

# Get the storage account key
Select-AzureSubscription $subscriptionName
$storageaccountkey = get-azurestoragekey $storageAccountName | %{$_.Primary}

# Create the storage context object
$destContext = New-AzureStorageContext -StorageAccountName $storageAccountName -
StorageAccountKey $storageaccountkey

# Copy the file from local workstation to the Blob container
Set-AzureStorageBlobContent -File $fileName -Container $containerName -Blob $blobName -
context $destContext
```

   a. $subscriptionName to get your subscription name, type in **Get-AzureSubscription**, (assuming you've already done **Add-AzureAccount** and logged in). It will be listed under subscription name.
   b. $storageAccountName is the storage account name of the Azure Storage account that your Hadoop cluster is referencing, the same one we made in exercise 1 of this lab.
   c. $clusterName and $containerName should have the same name.
   d. $filename needs to be changed to the full file path to the Iris dataset that you saved.
   e. $blobname is what you want the file to be called once it is uploaded to the Azure Storage Blob.
3. Run the script
   a. Once the changes have been made, hit the run button:



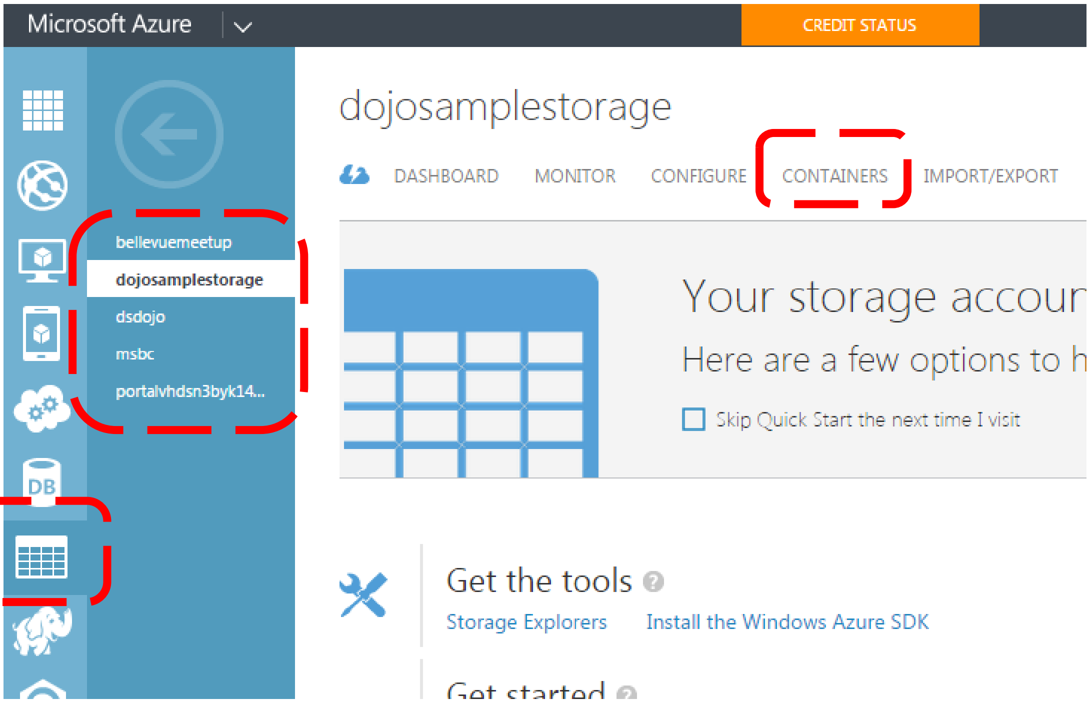
   b. If the script fails to run due to limited permissions:
      1. Input **Set-ExecutionPolicy RemoteSigned** into the command line console.
      2. State 'yes' to the pop-up.
   c. You should get a similar response in your PowerShell console after the script completes.



```
$subscriptionName = [redacted]
$storageAccountName = "dojosamplestorage"
$containerName = "dojosamplehadoop"
$clusterName = "dojosamplehadoop"

#uploads to https://dojosamplestorage.blob.core.windows.net/dojosamplecluster/iris.csv
$fileName ="C:\Users\PhucHDuong\Documents\Data Mining\HDInsight Map Reduce Example\iris.data.csv"
$blobName = "iris.csv"

# Get the storage account key
Select-AzureSubscription $subscriptionName
$storageaccountkey = get-azurestoragekey $storageAccountName | %{$_.Primary}

# Create the storage context object
$destContext = New-AzureStorageContext -StorageAccountName $storageAccountName -StorageAccountKey $storageaccountkey

# Copy the file from local workstation to the Blob container
Set-AzureStorageBlobContent -File $fileName -Container $containerName -Blob $blobName -context $destContext
```

```
Environment               : AzureCloud
SupportedModes            : AzureServiceManagement
DefaultAccount            : [redacted]
Accounts                  : [redacted]
IsDefault                 : False
IsCurrent                 : False
CurrentStorageAccountName :

ICloudBlob        : Microsoft.WindowsAzure.Storage.Blob.CloudBlockBlob
BlobType          : BlockBlob
Length            : 4551
ContentType       : application/octet-stream
LastModified      : 1/10/2015 11:26:58 AM +00:00
SnapshotTime      :
ContinuationToken :
Context           : Microsoft.WindowsAzure.Commands.Common.Storage.AzureStorageContext
Name              : iris.csv
```

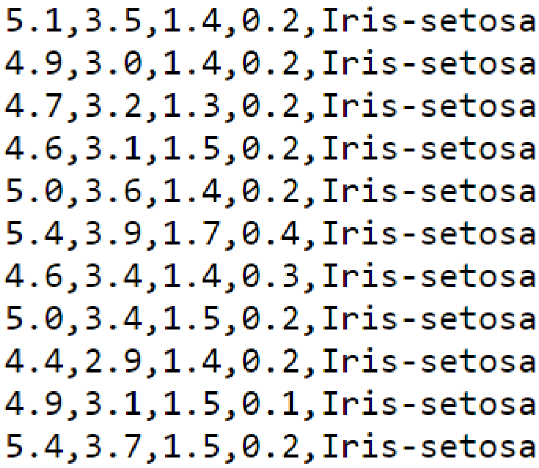
4. Confirm the file's existence on the blob.
   a. Go to your **Azure portal > Storage > YourStorage > Containers > YourContainer**



   b. Locate your file.

Exercise 3: Importing Datasets as Hive Tables

4. Create a new table with a defined schema.
   a. Log back into your Hadoop cluster’s query console, then go to your Hive Editor.
   b. We will now create a new table which our data will be uploaded into. This table will be blank, but the schema and storage will be provisioned. This will give our data structure when we populate it into Hadoop as a Hive table.
   c. Preview the Iris dataset from your local file.

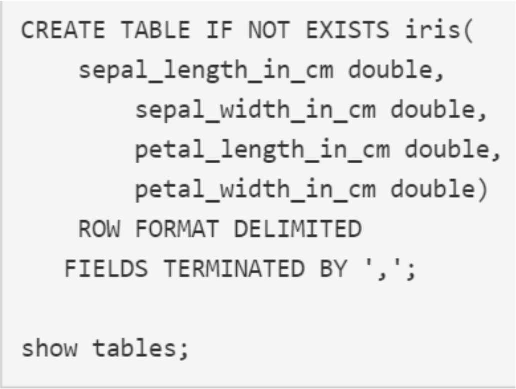


```
5.1,3.5,1.4,0.2,Iris-setosa
4.9,3.0,1.4,0.2,Iris-setosa
4.7,3.2,1.3,0.2,Iris-setosa
4.6,3.1,1.5,0.2,Iris-setosa
5.0,3.6,1.4,0.2,Iris-setosa
5.4,3.9,1.7,0.4,Iris-setosa
4.6,3.4,1.4,0.3,Iris-setosa
5.0,3.4,1.5,0.2,Iris-setosa
4.4,2.9,1.4,0.2,Iris-setosa
4.9,3.1,1.5,0.1,Iris-setosa
5.4,3.7,1.5,0.2,Iris-setosa
```

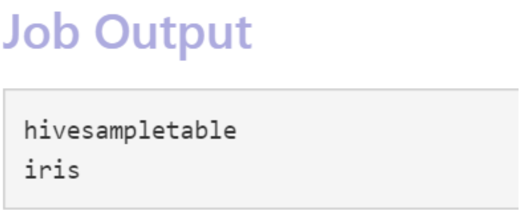
      i. From the preview, we want the schema to accept DOUBLE, DOUBLE, DOUBLE, DOUBLE, STRING.

d. To find out what each column represents, visit: https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.names
    i. Go to #7 in the file, under “attribute information”
    ii. This is what we will name our columns.

e. Syntax: **create table myTableName(mySchema**)



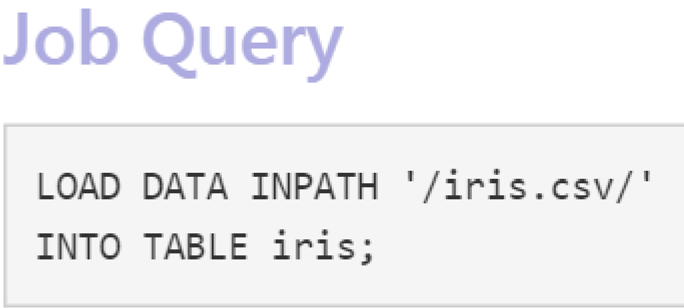
```
CREATE TABLE IF NOT EXISTS iris(
    sepal_length_in_cm double,
        sepal_width_in_cm double,
        petal_length_in_cm double,
        petal_width_in_cm double)
    ROW FORMAT DELIMITED
   FIELDS TERMINATED BY ',';

show tables;
```



Job Output

```
hivesampletable
iris
```

5. Execute “show tables” again to confirm if the table was created. Although the table shows up, it currently has no fields. We can now load data into this table.
6. Load data into the table from your Azure Blob storage.

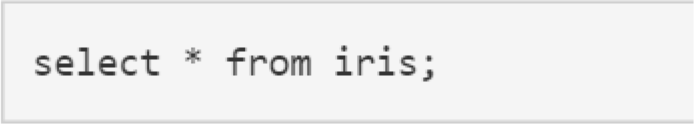


Job Query

```
LOAD DATA INPATH '/iris.csv/'
INTO TABLE iris;
```

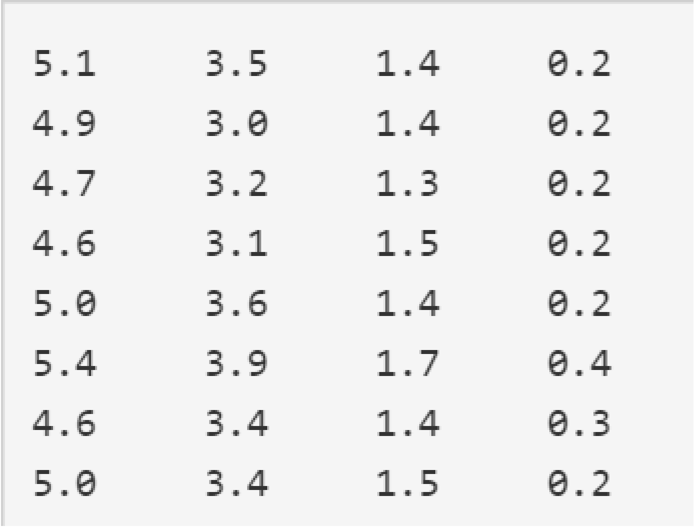
LOAD DATA INPATH, notice how the file path is simply /iris.csv. We did not have to specify which storage or which container because we already uploaded the file to the default location that the Hadoop cluster reads from.

Job Query



```
select * from iris;
```

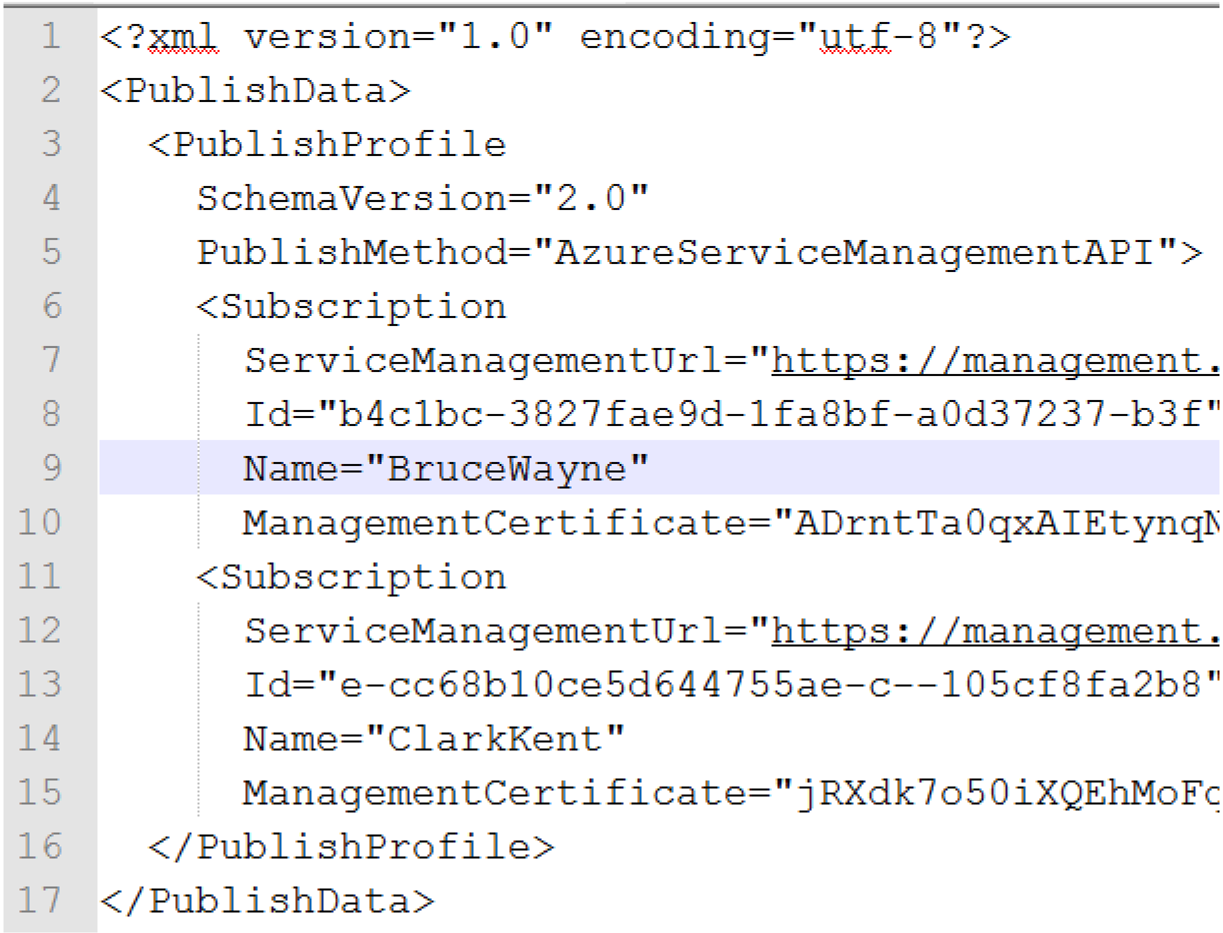
Job Output



```
5.1     3.5     1.4     0.2
4.9     3.0     1.4     0.2
4.7     3.2     1.3     0.2
4.6     3.1     1.5     0.2
5.0     3.6     1.4     0.2
5.4     3.9     1.7     0.4
4.6     3.4     1.4     0.3
5.0     3.4     1.5     0.2
```

Appendix & Alternative Methods

1. Manual Azure Authentication In Azure PowerShell: **(skip this step if automatic authentication works)**
2. Sometimes **Add-AzureAccount** grabs the wrong subscription ID or subscription name. This can result from complications in your Azure account such as multiple subscriptions under different party names. To remedy this, we must manually authenticate and then reference the Azure account name directly.
3. Type in the following command: **Get-AzurePublishSettingsFile,** which will initiate a file download.
4. Download the settings file. Rename it something short: “mySubcription.publishsettings”
5. Open up the file in notepad, sublime, notepad++, or any other IDE.



```xml
<?xml version="1.0" encoding="utf-8"?>
<PublishData>
  <PublishProfile
    SchemaVersion="2.0"
    PublishMethod="AzureServiceManagementAPI">
    <Subscription
      ServiceManagementUrl="https://management.
      Id="b4c1bc-3827fae9d-1fa8bf-a0d37237-b3f"
      Name="BruceWayne"
      ManagementCertificate="ADrntTa0qxAIEtynqN
    <Subscription
      ServiceManagementUrl="https://management.
      Id="e-cc68b10ce5d644755ae-c--105cf8fa2b8"
      Name="ClarkKent"
      ManagementCertificate="jRXdk7o50iXQEhMoFq
  </PublishProfile>
</PublishData>
```

   a. Note the name of the subscription you want to use.
      i. “BruceWayne” is our example.
   b. Append all PowershellScripts

```powershell
$subscriptionSettingsFile = "C:\Users\Bruce Wayne\Desktop\BizSpark.publishsettings"

Import-AzurePublishSettingsFile $subscriptionSettingsFile
Get-AzureSubscription
Select-AzureSubscription -SubscriptionName "Bruce Wayne"
```