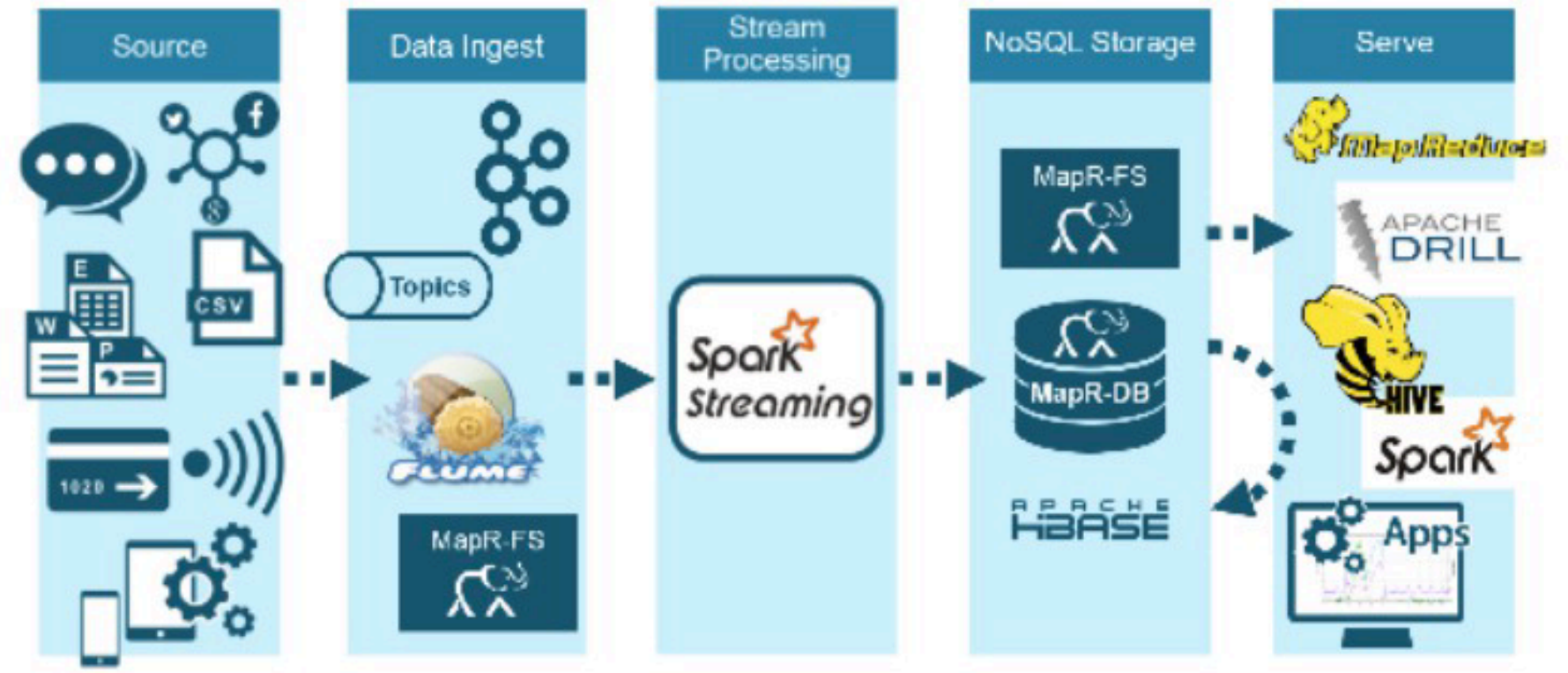
Spark Streaming

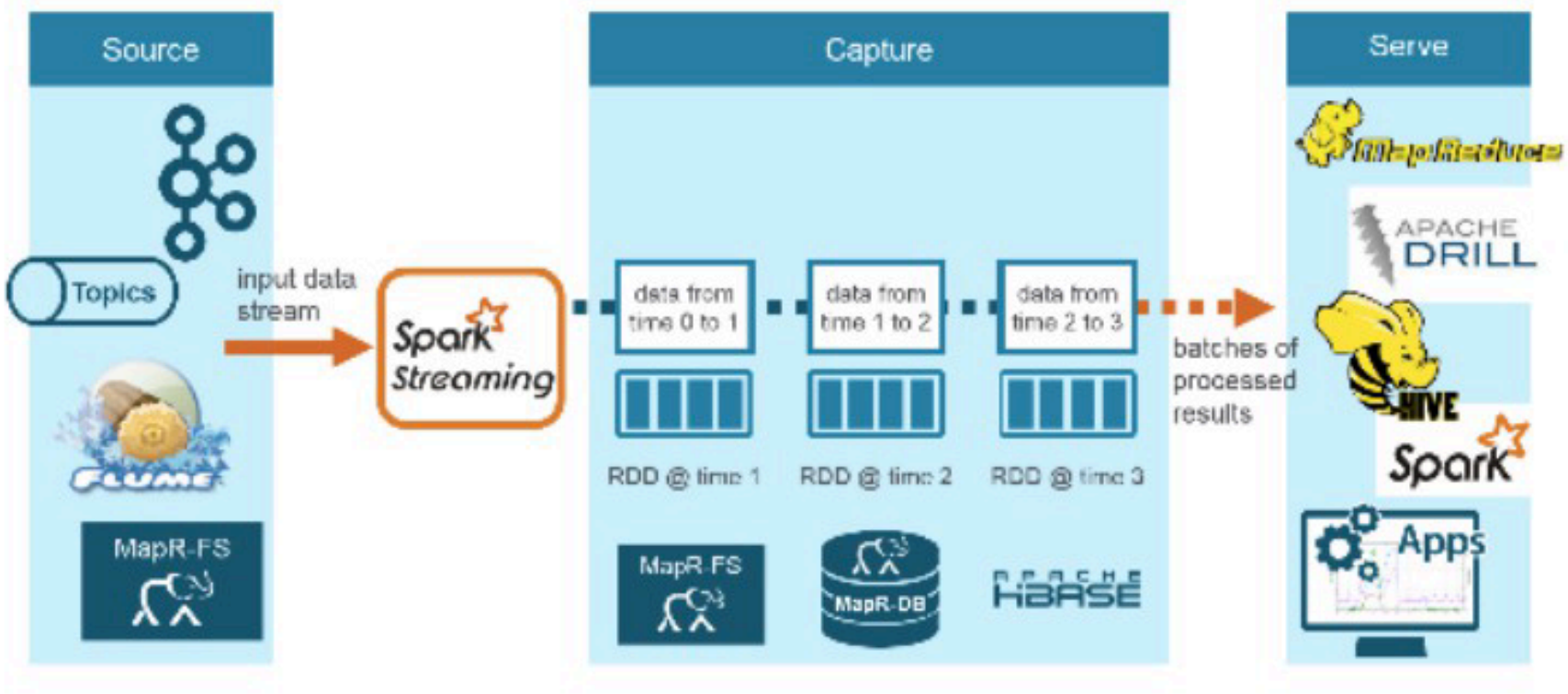
Thaveewat Khanan

Stream Process Architecture



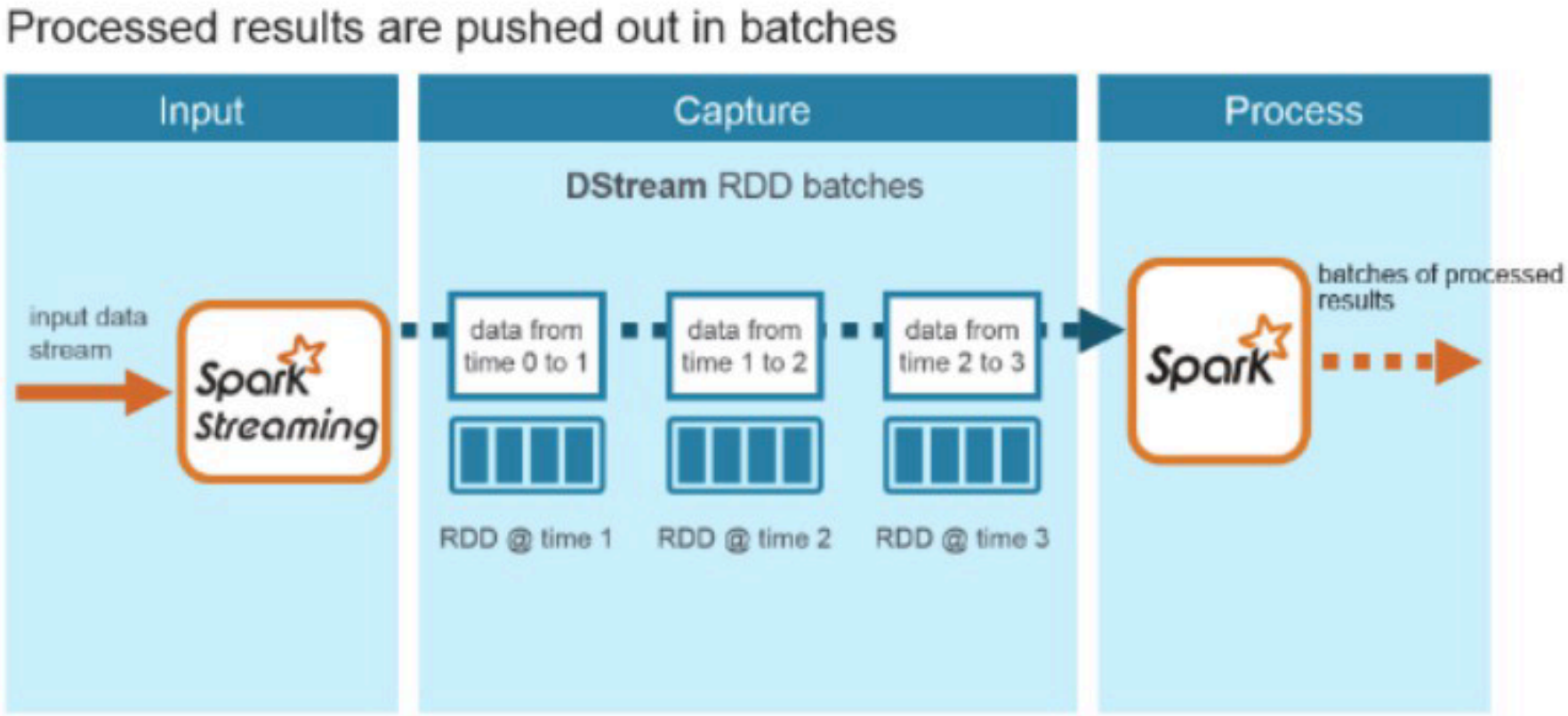
Source: MapR Academy

Spark Streaming Architecture



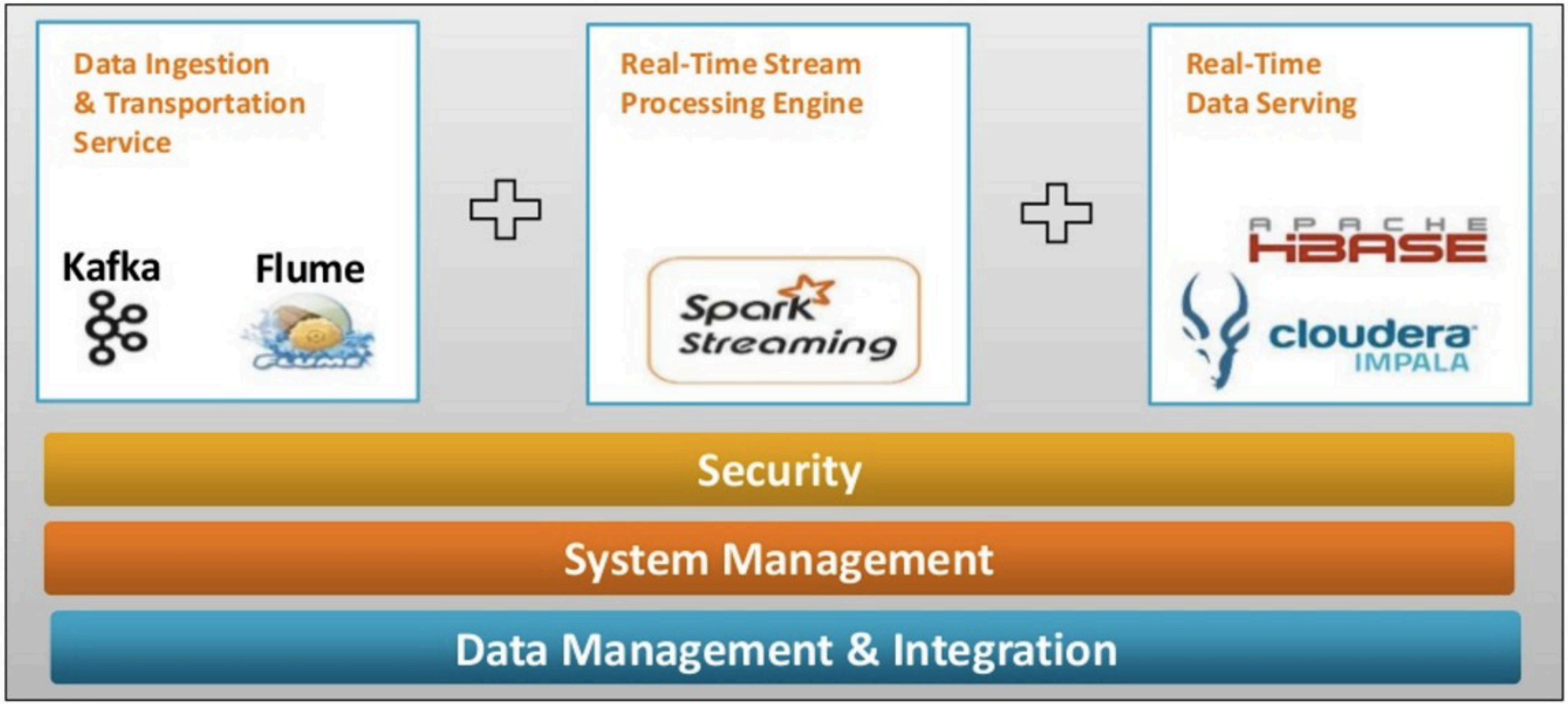
Source: MapR Academy

Processing Spark DStreams



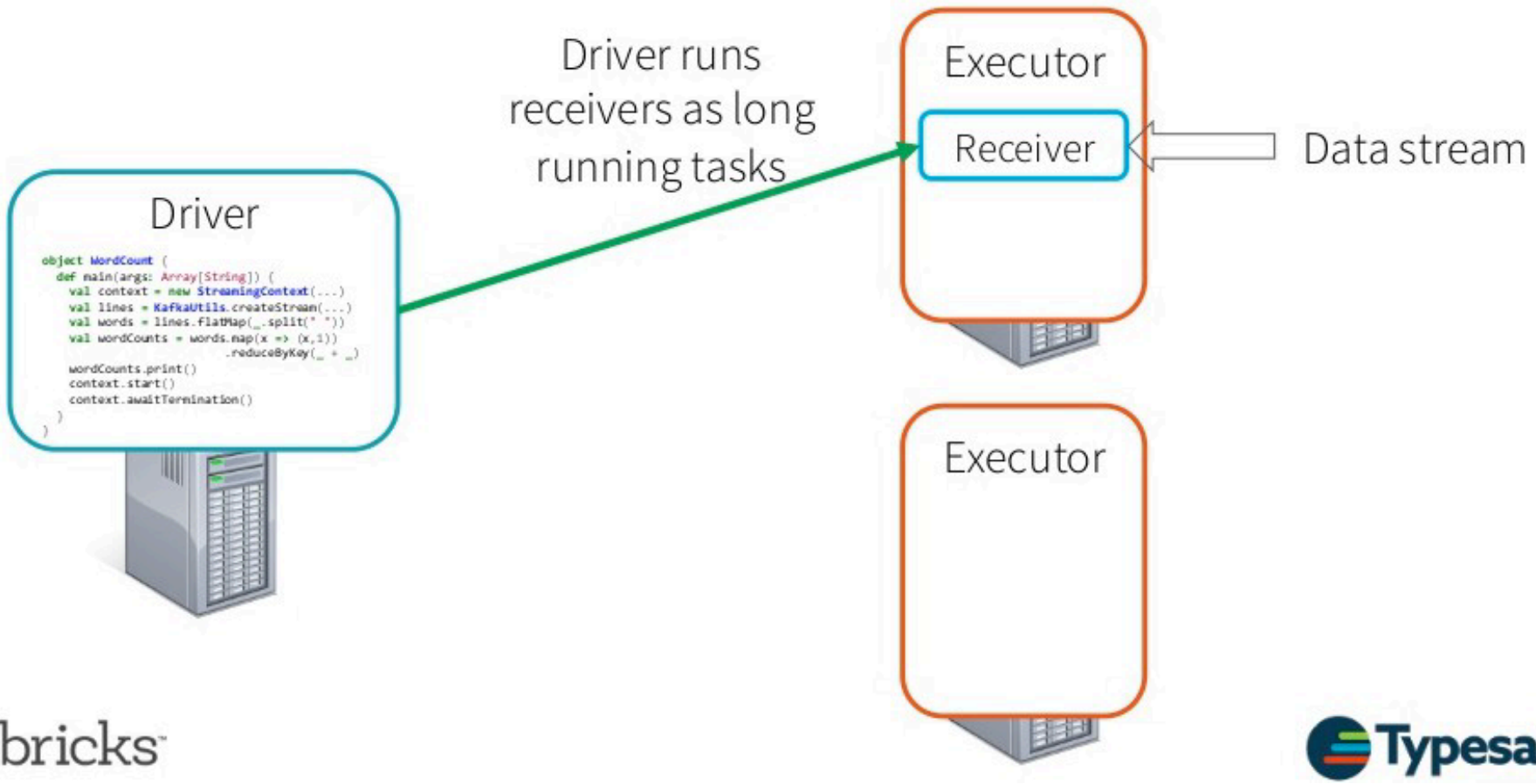
Source: MapR Academy

Streaming Architecture



Source: Cloudera

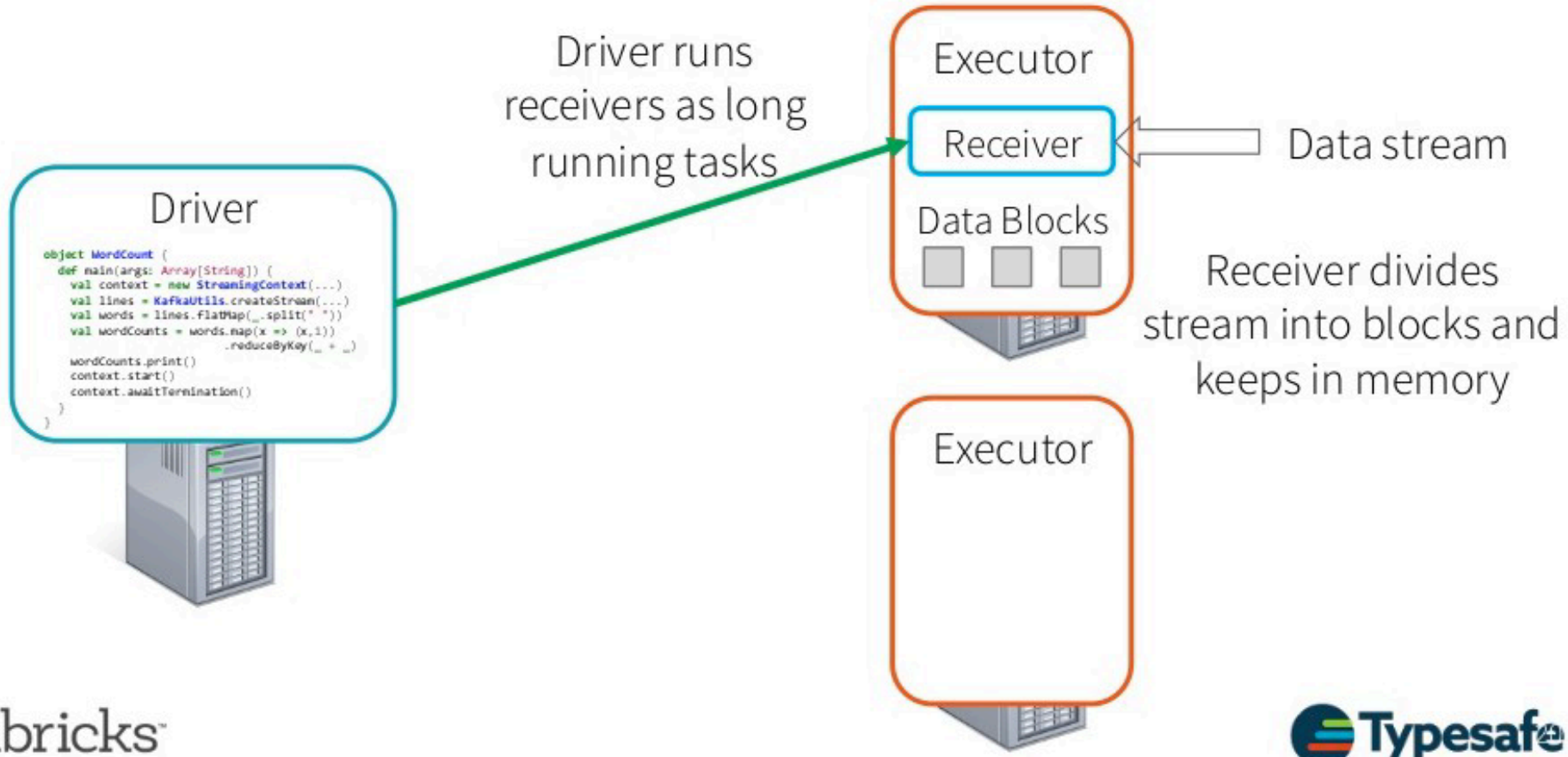
Spark Streaming Application: Receive data



databricks

Typesafe

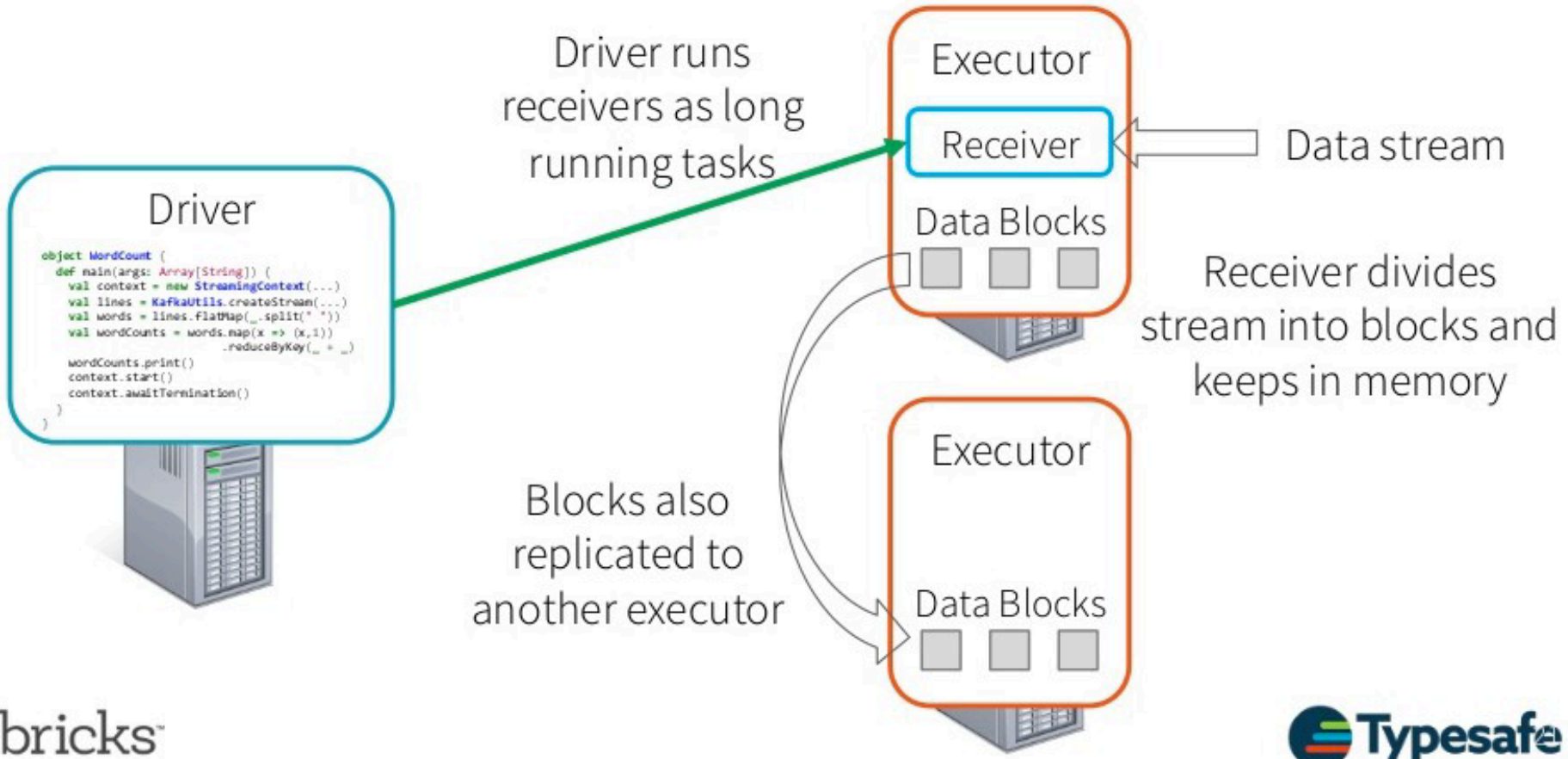
Spark Streaming Application: Receive data



databricks

Typesafe

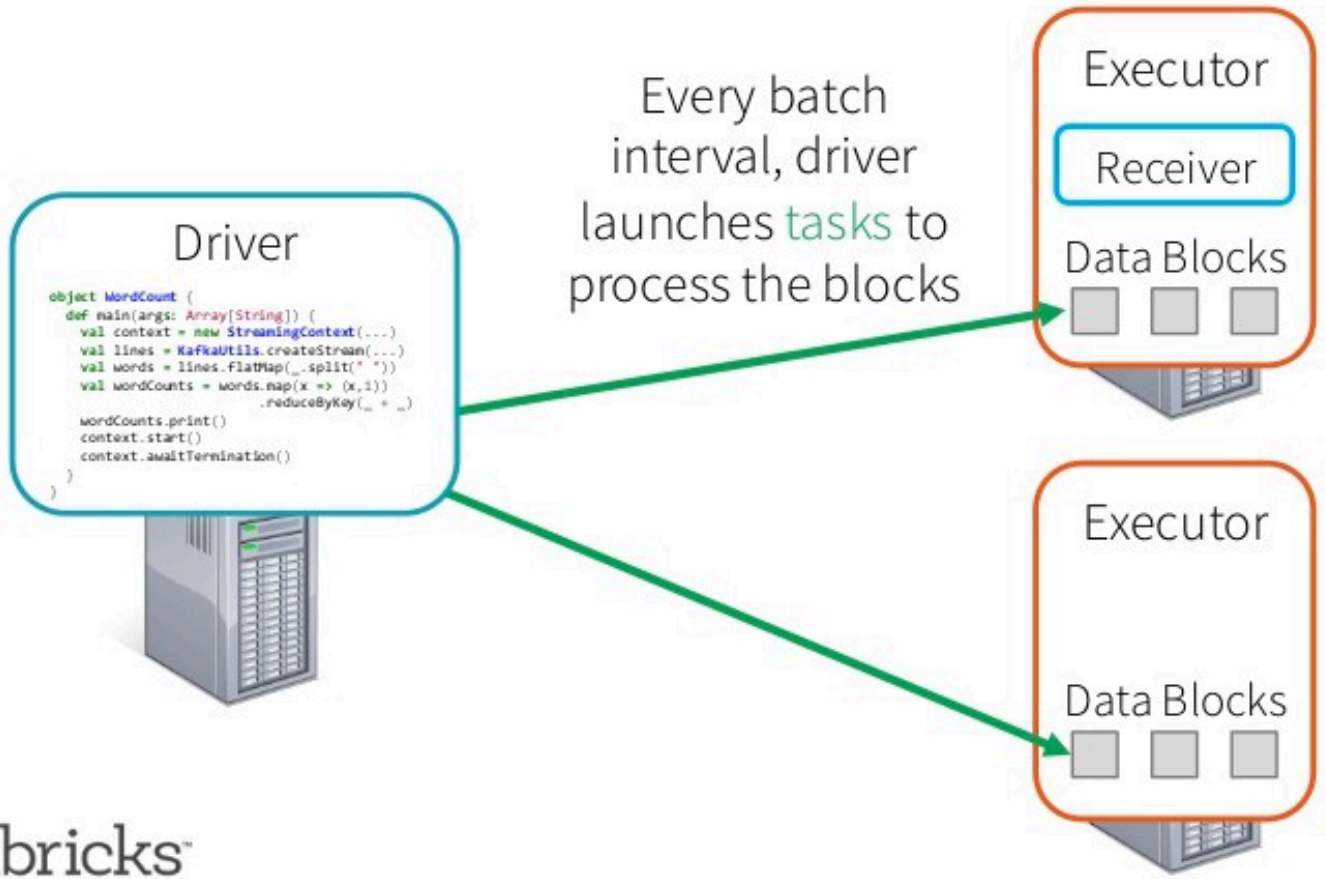
Spark Streaming Application: Receive data



databricks

Typesafe

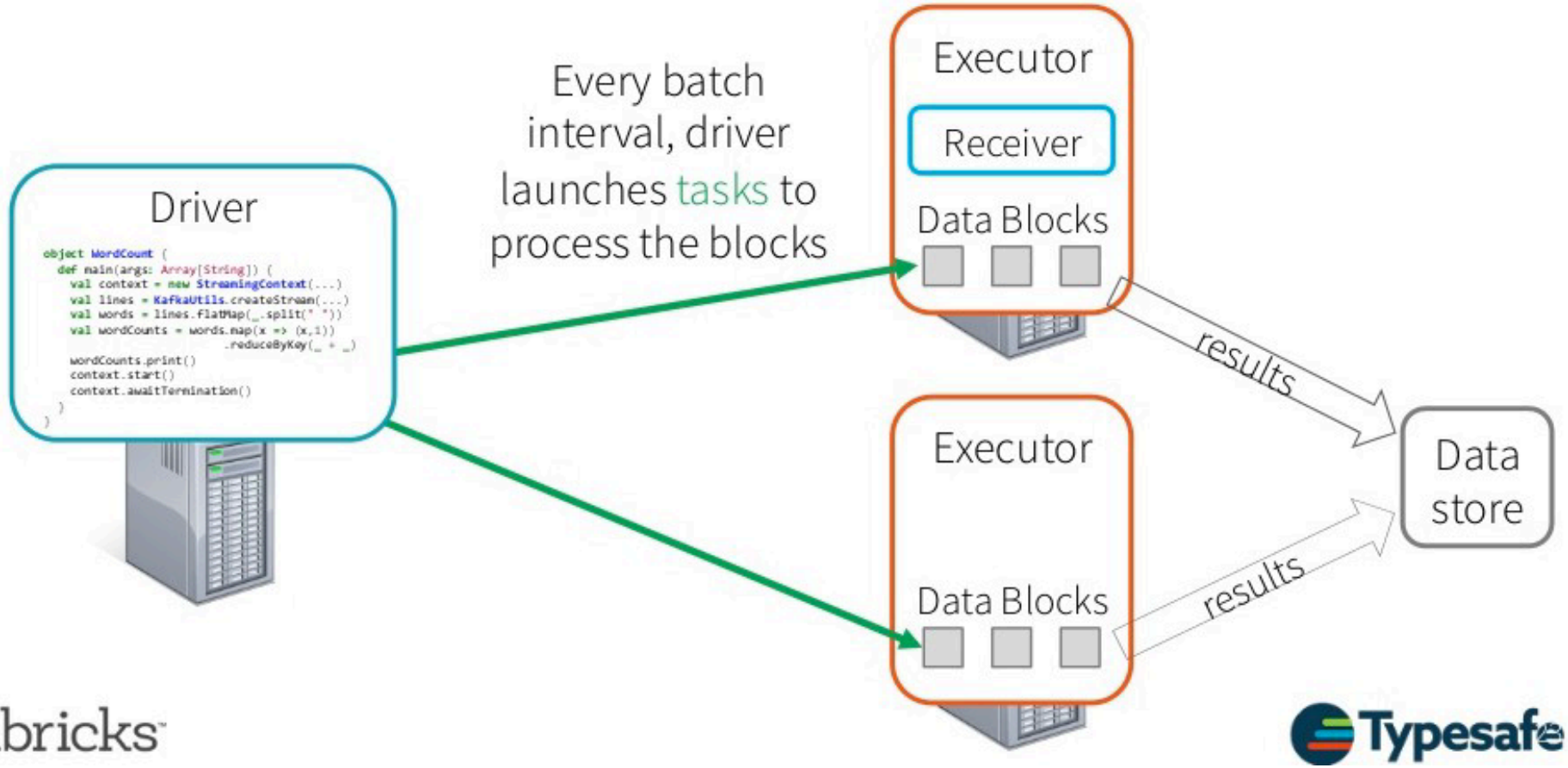
Spark Streaming Application: Process data



databricks

Typesafe

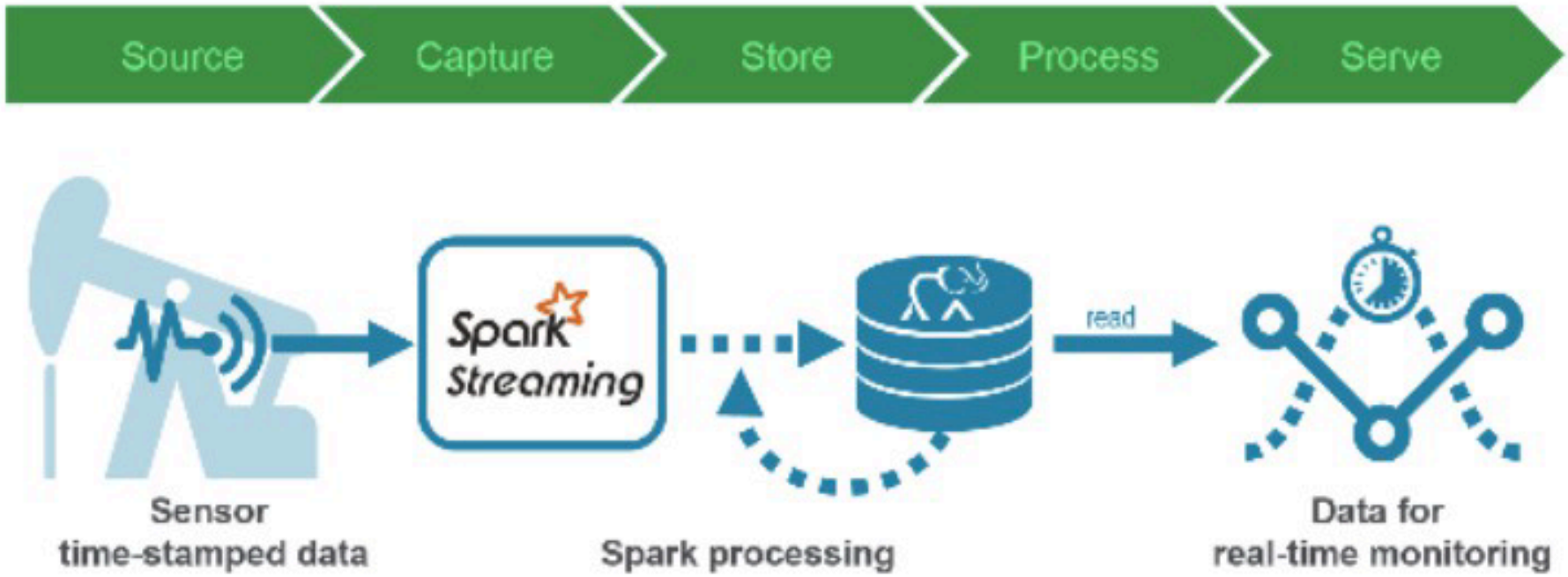
Spark Streaming Application: Process data



databricks

Typesafe

Use Case: Time Series Data



Source: MapR Academy

DStream Functional operations

flatMap(flatMapFunc)

filter(filterFunc)

map(mapFunc)

mapPartitions(mapPartFunc, preservePartitioning)

forEachRDD(forEachFunc

DStream Output operations

print()

saveAsHadoopFiles(...)

saveAsTextFiles(...)

saveAsObjectFiles(...)

saveAsNewAPIHadoopFiles(...)

forEachRDD(..)

Spark Streaming

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Get Example Code

$ cd spark

$ wget https://github.com/bobbylovemovie/trainbigdata/raw/master/Spark/StreamingWordCount.py

```
1  from pyspark import SparkContext
2  from pyspark.streaming import StreamingContext
3
4  # Create a local StreamingContext with two working thread and batch interval of 1 second
5  sc = SparkContext("local[2]", "NetworkWordCount")
6  ssc = StreamingContext(sc, 10)
7
8  lines = ssc.socketTextStream("localhost", 9999)
9  words = lines.flatMap(lambda line: line.split(" "))
10
11 # Count each word in each batch
12 pairs = words.map(lambda word: (word, 1))
13 wordCounts = pairs.reduceByKey(lambda x, y: x + y)
14
15 # Print the first ten elements of each RDD generated in this DStream to the console
16 wordCounts.pprint()
17 #wordCounts.saveAsTextFiles("hdfs:///user/cloudera/output/sparkstream/sparkstream")
18 ssc.start()             # Start the computation
19 ssc.awaitTermination()  # Wait for the computation to terminate
```

Spark Streaming

Run Python Spark

$ spark-submit StreamingWordCount.py

Running the netcat server on another window

$ nc -lk 9999

```
[cloudera@quickstart ~]$ nc -lk 9999
Hello Bigdata Training
```

Result SparkStreaming

```
-------------------------------------------
Time: 2016-10-15 08:22:30
-------------------------------------------
(u'', 1)
(u'Training', 1)
(u'Hello', 1)
(u'Bigdata', 1)
```

Streaming Twitter data

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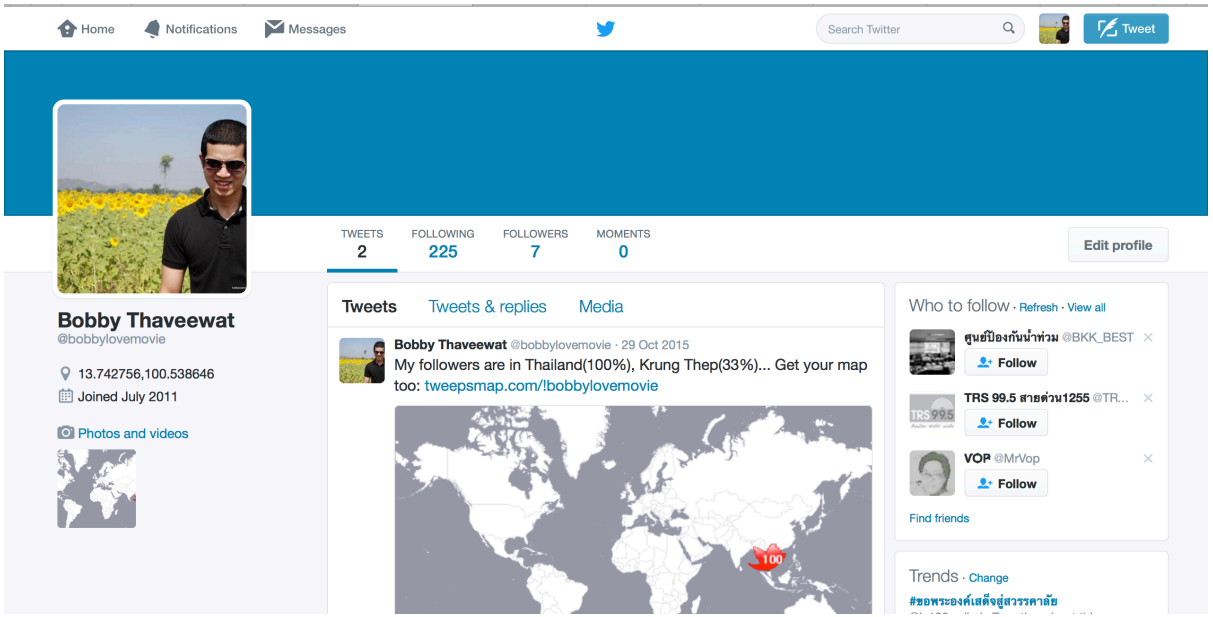
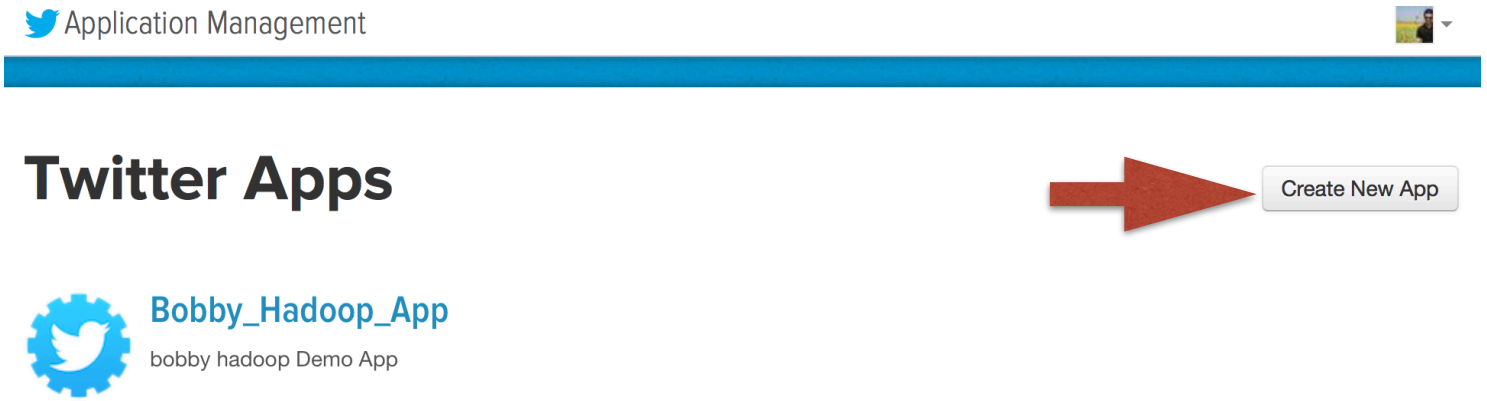
Create a new Twitter App Login to your Twitter @ twitter.com



Create a new Twitter App https://apps.twitter.com



Create a new Twitter App (cont.)

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Enter all the details in the application:

Application Details

Name *

Bobby_SparkStreaming_Demo_App

Your application name. This is used to attribute the source of a tweet and in user-facing authorization screens. 32 characters max.

Description *

Streaming Twitter data Demo App

Your application description, which will be shown in user-facing authorization screens. Between 10 and 200 characters max.

Website *

http://www.it.acc.chula.ac.th

Your application's publicly accessible home page, where users can go to download, make use of, or find out more information about your application. This fully-qualified URL is used in the source attribution for tweets created by your application and will be shown in user-facing authorization screens.
(If you don't have a URL yet, just put a placeholder here but remember to change it later.)

Callback URL

Where should we return after successfully authenticating? OAuth 1.0a applications should explicitly specify their oauth_callback URL on the request token step, regardless of the value given here. To restrict your application from using callbacks, leave this field blank.

Developer Agreement

☑ Yes, I have read and agree to the Twitter Developer Agreement.

Create a new Twitter App (cont.)

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Your application will be created:

Bobby_SparkStreaming_Demo_App

Test OAuth

Details | Settings | Keys and Access Tokens | Permissions

Streaming Twitter data Demo App

http://www.it.acc.chula.ac.th

Organization

Information about the organization or company associated with your application. This information is optional.

Organization	None
Organization website	None

Application Settings

Your application's Consumer Key and Secret are used to authenticate requests to the Twitter Platform.

Access level	Read and write (modify app permissions)
Consumer Key (API Key)	eSevkYKyO94uGtFxxHoGwXDpX (manage keys and access tokens)
Callback URL	None
Callback URL Locked	No
Sign in with Twitter	Yes
App-only authentication	https://api.twitter.com/oauth2/token
Request token URL	https://api.twitter.com/oauth/request_token

Create a new Twitter App (cont.)

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Click on Keys and Access Tokens:

Bobby_SparkStreaming_Demo_App

Details | Settings | Keys and Access Tokens | Permissions

Application Settings

Keep the "Consumer Secret" a secret. This key should never be human-readable in your application.

Consumer Key (API Key)	eSevkYKyO94uGtFxxHoGwXDpX
Consumer Secret (API Secret)	OvjqlF8VmNScaeMGZjz9e1flfq0TxehmwkMJ454wHCCUG0AvED
Access Level	Read and write (modify app permissions)
Owner	bobbylovemovie
Owner ID	344100790

Create a new Twitter App (cont.)

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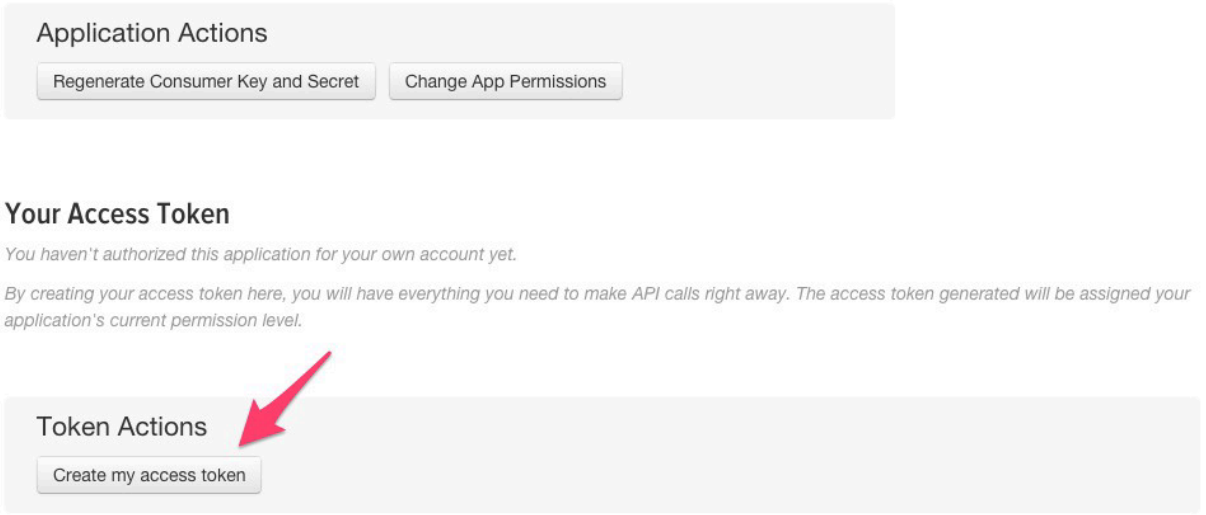
Click on Keys and Access Tokens:



Your Access Token

This access token can be used to make API requests on your own account's behalf. Do not share your access token secret with anyone.

Access Token	344100790-rOcjGTw9wdmD5FVwacOaR7ZriGPRILBZiha43Tyg
Access Token Secret	2t41euCCQiwmdkihxkBWAS2rOTfTJpTAHUy27fOAZILWE
Access Level	Read and write
Owner	bobbylovemovie
Owner ID	344100790

Download the third-party libraries

```
$ wget https://github.com/bobbylovemovie/trainbigdata/raw/master/Spark/
twitter4j-core-4.0.2.jar
$ wget https://github.com/bobbylovemovie/trainbigdata/raw/master/Spark/
twitter4j-stream-4.0.2.jar
$ wget https://github.com/bobbylovemovie/trainbigdata/raw/master/Spark/
spark-streaming-twitter_2.10-1.2.0.jar
```

Run Spark-shell

```
$ spark-shell --jars spark-streaming-twitter_2.10-1.2.0.jar,twitter4j-
stream-4.0.2.jar,twitter4j-core-4.0.2.jar
```

Running Spark commands


```
$ scala> :paste
// Entering paste mode (ctrl-D to finish)
import org.apache.spark.streaming.twitter._
import twitter4j.auth._
import twitter4j.conf._
import org.apache.spark.streaming.{Seconds, StreamingContext}
import org.apache.spark._
import org.apache.spark.streaming._
import org.apache.spark.streaming.StreamingContext._
val ssc = new StreamingContext(sc, Seconds(10))
val cb = new ConfigurationBuilder
```

Running Spark commands(cont.)

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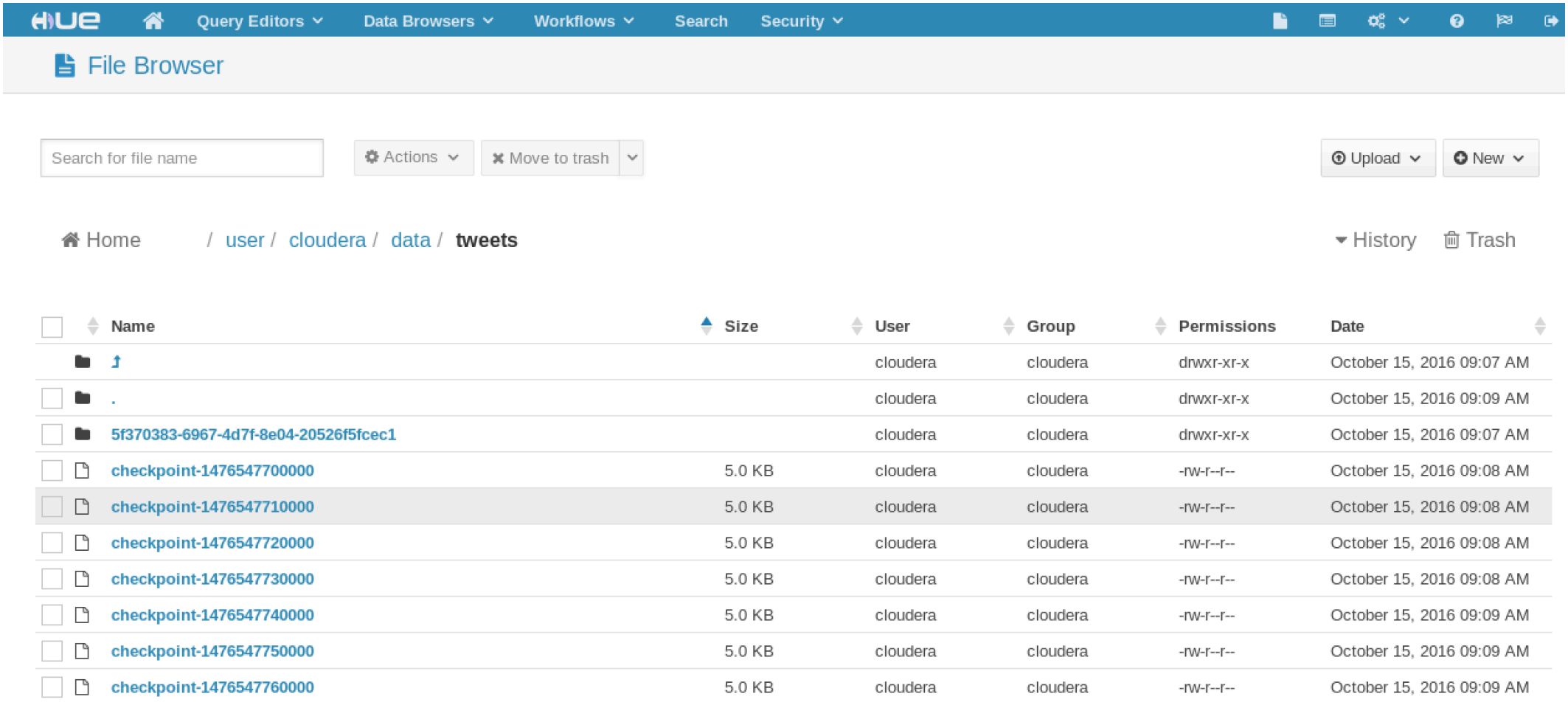
```
cb.setDebugEnabled(true).setOAuthConsumerKey("eSevkYKyO94uGtFxxHoG
wXDpX").setOAuthConsumerSecret("OvjqIF8VmNScaeMGZjz9e1fIfq0TxehmW
kMJ454wHCCUG0AvED").setOAuthAccessToken("344100790-
rOcjGTw9wdmD5FVwacOaR7ZriGPRILBZiha43Tyg").setOAuthAccessTokenSe
cret("2t41euCCQiwmdkihxkBWAS2rOTfTJpTAHUy27fOAZILWE")
val auth = new OAuthAuthorization(cb.build)
val tweets = TwitterUtils.createStream(ssc,Some(auth))
val status = tweets.map(status => status.getText)
status.print
ssc.checkpoint("hdfs:///user/cloudera/data/tweets")
ssc.start
ssc.awaitTermination
```



	Name	Size	User	Group	Permissions	Date
	..		cloudera	cloudera	drwxr-xr-x	October 15, 2016 09:07 AM
	.		cloudera	cloudera	drwxr-xr-x	October 15, 2016 09:09 AM
	5f370383-6967-4d7f-8e04-20526f5fcec1		cloudera	cloudera	drwxr-xr-x	October 15, 2016 09:07 AM
	checkpoint-1476547700000	5.0 KB	cloudera	cloudera	-rw-r--r--	October 15, 2016 09:08 AM
	checkpoint-1476547710000	5.0 KB	cloudera	cloudera	-rw-r--r--	October 15, 2016 09:08 AM
	checkpoint-1476547720000	5.0 KB	cloudera	cloudera	-rw-r--r--	October 15, 2016 09:08 AM
	checkpoint-1476547730000	5.0 KB	cloudera	cloudera	-rw-r--r--	October 15, 2016 09:08 AM
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