Spark - II

- Install & setup [Docker]
- Code - walkthroughs

Installation & Setup

Learning: Single box

→ Docker containers

→ Install on Linux/Mac/Win

Production (Network & Ops teams)

1. Cluster + Spark
2. AWS EMR
3. Azure Databricks
4. Databricks

Docker explained in detail

Case Study 13: Semantic Search Engine for Q&A [Design + Code]

- 73.1 Semantic Search for Q&A [Design + Code] --- Part 1
- 73.2 Semantic Search for Q&A [Design + Code] --- Part 2
- 73.3 Semantic Search for Q&A [Design + Code] --- Part 3
- 73.4 Semantic Search for Q&A [Design + Code] --- Part 4

Docker - based:

① Docker - desktop : https://www.docker.com/products/docker-desktop

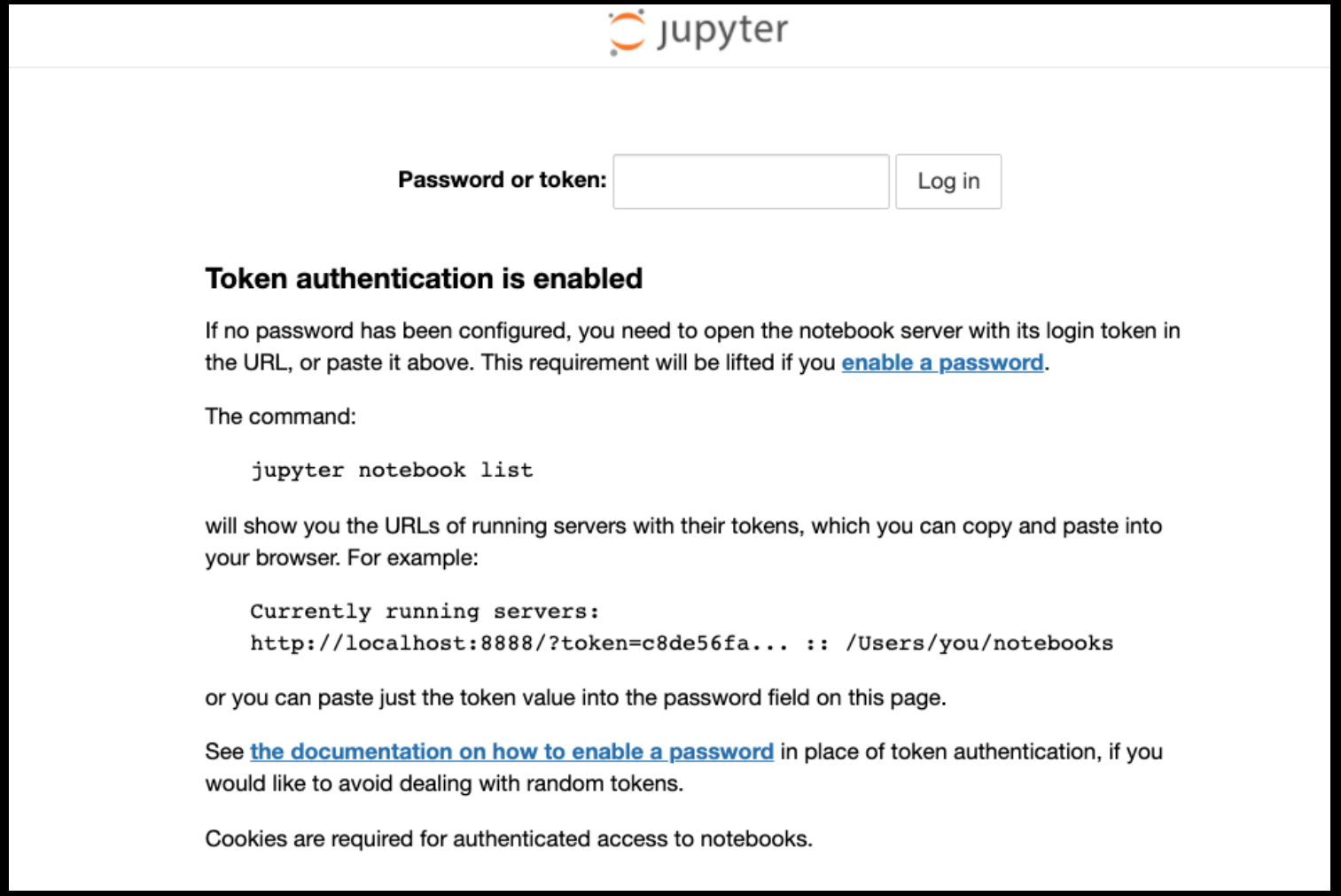
② Spark on Docker :

```
$ docker pull jupyter/pyspark-notebook
```

```
$ docker run -it -p 8888:8888 jupyter/pyspark-notebook
```

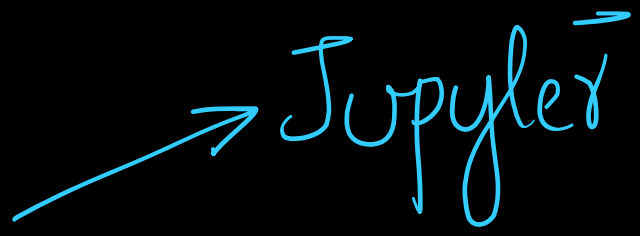
```
(base) Srikanths-MBP:home varma$ docker run -it -p 8888:8888 jupyter/pyspark-notebook
Executing the command: jupyter notebook
[I 07:17:05.000 NotebookApp] Writing notebook server cookie secret to /home/jovyan/.local/share/jupyter/runtime/notebook
e_secret
[I 07:17:05.612 NotebookApp] JupyterLab extension loaded from /opt/conda/lib/python3.8/site-packages/jupyterlab
[I 07:17:05.612 NotebookApp] JupyterLab application directory is /opt/conda/share/jupyter/lab
[I 07:17:05.615 NotebookApp] Serving notebooks from local directory: /home/jovyan
[I 07:17:05.615 NotebookApp] The Jupyter Notebook is running at:
[I 07:17:05.615 NotebookApp] http://34f08692a5ec:8888/?token=1b5188f89d2108ac5acdf0866eba14b626da7ec2faece1cb
[I 07:17:05.615 NotebookApp]  or http://127.0.0.1:8888/?token=1b5188f89d2108ac5acdf0866eba14b626da7ec2faece1cb
[I 07:17:05.615 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 07:17:05.618 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///home/jovyan/.local/share/jupyter/runtime/nbserver-7-open.html
    Or copy and paste one of these URLs:
        http://34f08692a5ec:8888/?token=1b5188f89d2108ac5acdf0866eba14b626da7ec2faece1cb
     or http://127.0.0.1:8888/?token=1b5188f89d2108ac5acdf0866eba14b626da7ec2faece1cb
[I 07:17:11.861 NotebookApp] 302 GET / (172.17.0.1) 0.61ms
[I 07:17:11.866 NotebookApp] 302 GET /tree? (172.17.0.1) 0.81ms
```

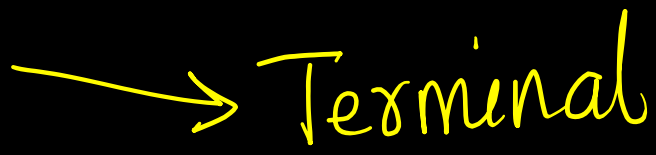
http://localhost:8888/



pySpark API: http://spark.apache.org/docs/latest/api/python/pyspark.html

```
# Compute value of PI using Monte Carlo Approach
# Source: http://spark.apache.org/examples.html

import pyspark
import random
if not 'sc' in globals():
    sc = pyspark.SparkContext()

NUM_SAMPLES = 1000000

def inside(p):
    x, y = random.random(), random.random()
    return x*x + y*y < 1

# parallelize:http://spark.apache.org/docs/latest/api/python/pyspark.html?highlight=parallelize
# filter: http://spark.apache.org/docs/latest/api/python/pyspark.html
count = sc.parallelize(range(0, NUM_SAMPLES),10) \
            .filter(inside).count()

print("Pi is roughly %f" % (4.0 * count / NUM_SAMPLES))
```






```
$ spark-submit pi.py
```

```
# Word Count using Spark

text_file = sc.textFile("./sample.txt") #Can be a hdfs://.. path
also
counts = text_file.flatMap(lambda line: line.split(" ")) \
        .map(lambda word: (word, 1)) \
        .reduceByKey(lambda a, b: a + b)

counts.saveAsTextFile("./count_output") # can be a hdfs://...
directory/path also

# $ cat count_output/*
# $ ls -lrt count_output : Multiple part files
```

Loads of examples:

http://spark.apache.org/examples.html
https://spark.apache.org/docs/latest/sql-getting-started.html
https://spark.apache.org/docs/latest/mllib-guide.html
https://github.com/apache/spark/tree/master/examples/src/main/python