



Containers		Container CPU usage		Container memory usage		Show charts	
	Name	Container ID	Image	Port(s)	CPU (%)	Memory usage	Actions
<input type="checkbox"/>	hadoop-spark	-	-	-	2.61%	2.51GB / 18.89	
<input type="checkbox"/>	spark-master	146500fa910b	apache/spark:2022-07-07T22:00:00Z	7077-7077 Show all ports(2)	0.13%	219.6MB / 3.78	
<input type="checkbox"/>	hadoop-mast	0d3ec55415ae	bde2020/h	9000-9000 Show all ports(2)	1.99%	1.47GB / 3.78	
<input type="checkbox"/>	spark-worker	e25558b80581	apache/spark:2022-07-07T22:00:00Z	-	0.11%	139.2MB / 3.78	
<input type="checkbox"/>	hadoop-work	8417312ee55d	bde2020/h	-	0.18%	336.5MB / 3.78	
<input type="checkbox"/>	hadoop-work	47172567ff83	bde2020/h	-	0.2%	367.8MB / 3.78	
<input type="checkbox"/>	tp7	-	-	-	0%	0B / 0B	

Showing 7 items

```
Engine running | RAM 3.47 GB CPU 3.02% Disk: 11.36 GB used (limit 1006.85 GB) > Terminal v 4.55.0

[+] Running 13/13 docker compose down -v
  spark-worker Pulled
  spark-master Pulled
  6f32e041863d Pull complete
  7007490126ef Pull complete
  a5b06dad3503 Pull complete
  9c387219ad28 Pull complete
  e43f1f40dafc Pull complete
  d1818ec198c0 Pull complete
  a148cf41a5df Pull complete
  f67b63cf36d1 Pull complete
  d35079eec123 Pull complete
  4f4fb700ef54 Pull complete
  616eb43372c1 Pull complete
[+] Running 9/9
  Network hadoop-spark_hadoop-net Created
  Volume hadoop-spark_hadoop_datanode2 Created
  Volume hadoop-spark_hadoop_namenode Created
  Volume hadoop-spark_hadoop_datanode1 Created
  Container hadoop-master Started
  Container spark-master Started
  Container spark-worker Started
  Container hadoop-worker2 Started
  Container hadoop-worker1 Started

C:\Users\User>cd D:\hadoop-spark

D:\hadoop-spark>docker cp spark-master:/opt/spark D:\hadoop-spark\spark
Successfully copied 363MB to D:\hadoop-spark\spark

D:\hadoop-spark>dir D:\hadoop-spark\spark
Volume in drive D has no label.
Volume Serial Number is B2FD-E245

Directory of D:\hadoop-spark\spark

09/14/2023  04:26 PM    <DIR>        .
09/14/2023  04:26 PM    <DIR>        ..
09/09/2023  03:08 AM    <DIR>        bin
09/09/2023  03:08 AM    <DIR>        data
09/09/2023  03:08 AM    <DIR>        examples
09/09/2023  03:08 AM    <DIR>        jars
09/14/2023  04:26 PM    <DIR>        python
09/09/2023  03:08 AM    <DIR>        R
09/14/2023  03:45 PM    0 RELEASE
09/09/2023  03:08 AM    <DIR>        sbin
09/09/2023  03:08 AM    <DIR>        tests
12/29/2025  11:16 AM    <DIR>        work-dir
               1 File(s)      0 bytes
              11 Dir(s)  72,577,568,768 bytes free

D:\hadoop-spark>docker cp D:\hadoop-spark\spark hadoop-master:/opt/
Successfully copied 363MB to hadoop-master:/opt/

D:\hadoop-spark>docker exec -it hadoop-master bash
root@hadoop-master:/# ls /opt
hadoop-3.2.1  spark
root@hadoop-master:/# /opt/spark/bin/spark-submit --version
/opt/spark/bin/load-spark-env.sh: line 68: ps: command not found
Welcome to

Using Scala version 2.12.18, OpenJDK 64-Bit Server VM, 1.8.0_232
Branch HEAD
Compiled by user ubuntu on 2023-09-09T01:53:29Z
```

```
D:\TP7>docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS
e25558b80581 apache/spark:3.5.0 "/opt/entrypoint.sh ..." 39 hours ago Up 39 hours
8417312ee55d bde2020/hadoop-datanode:2.0.0-hadoop3.2.1-java8 "/entrypoint.sh /run..." 39 hours ago Up 39 hours (healthy) 9864/tcp
47172567ff83 bde2020/hadoop-datanode:2.0.0-hadoop3.2.1-java8 "/entrypoint.sh /run..." 39 hours ago Up 39 hours (healthy) 9864/tcp
146500fa910b apache/spark:3.5.0 "/opt/entrypoint.sh ..." 39 hours ago Up 39 hours 0.0.0.0:7077->7077/tcp, [::]:7077->7077
/tcp, 0.0.0.0:8080->8080/tcp, [::]:8080->8080/tcp spark-master
8d3ec55415ae bde2020/hadoop-namenode:2.0.0-hadoop3.2.1-java8 "/entrypoint.sh /run..." 39 hours ago Up 39 hours (healthy) 0.0.0.0:9000->9000/tcp, [::]:9000->9000
/tcp, 0.0.0.0:9870->9870/tcp, [::]:9870->9870/tcp hadoop-master

D:\TP7>docker exec -it hadoop-master bash
root@hadoop-master:/# jps
3923 ResourceManager
5221 SecondaryNameNode
5112 DataNode
22978 Jps
142 NameNode
5407 NodeManager
root@hadoop-master:/opt/hadoop-3.2.1/sbin# hdfs --daemon start namenode
root@hadoop-master:/opt/hadoop-3.2.1/sbin# hdfs --daemon start datanode
root@hadoop-master:/opt/hadoop-3.2.1/sbin# hdfs --daemon start secondarynamenode
root@hadoop-master:/opt/hadoop-3.2.1/sbin# yarn --daemon start resourcemanager
root@hadoop-master:/opt/hadoop-3.2.1/sbin# yarn --daemon start nodemanager
root@hadoop-master:/opt/hadoop-3.2.1/sbin# jps
3923 ResourceManager
5221 SecondaryNameNode
5111 Jps
5112 DataNode
142 NameNode
5407 NodeManager
root@hadoop-master:/opt/hadoop-3.2.1/sbin# cd ~
root@hadoop-master:~# echo "Hello Spark Hello Hadoop" > file1.txt
root@hadoop-master:~# cat file1.txt
Hello Spark Hello Hadoop
root@hadoop-master:~# hdfs dfs -mkdir -p /input
root@hadoop-master:~# hdfs dfs -put file1.txt /input
2025-12-27 10:37:55,594 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
root@hadoop-master:~# hdfs dfs -ls /input
Found 1 items
-rw-r--r-- 3 root supergroup 25 2025-12-27 10:38 /input/file1.txt

D:\hadoop-spark>docker exec -it hadoop-master jps
368 Jps
151 NameNode

D:\hadoop-spark>docker exec -it hadoop-resourcemanager jps
480 Jps
77 ResourceManager

D:\hadoop-spark>docker exec -it hadoop-nodemanager jps
322 Jps
76 NodeManager

D:\hadoop-spark>docker exec -it hadoop-master bash
root@hadoop-master:/# ls $HADOOP_HOME/sbin
FederationStateStore mr-jobhistory-daemon.sh start-dfs.sh stop-balancer.sh workers.sh
distribute-exclude.sh refresh-namenodes.sh start-secure-dns.sh stop-dfs.cmd yarn-daemon.sh
hadoop-daemon.sh start-all.cmd start-yarn.cmd stop-dfs.sh yarn-daemons.sh
hadoop-daemons.sh start-all.sh start-yarn.sh stop-secure-dns.sh
httpfs.sh start-balancer.sh stop-all.cmd stop-yarn.cmd
kms.sh start-dfs.cmd stop-all.sh stop-yarn.sh

D:\TP7>docker exec -it hadoop-master bash
root@hadoop-master:/# hdfs dfs -ls /user/spark/output-wordcount
Found 3 items
-rw-r--r-- 3 spark supergroup 0 2025-12-28 10:07 /user/spark/output-wordcount/_SUCCESS
-rw-r--r-- 3 spark supergroup 10 2025-12-28 10:07 /user/spark/output-wordcount/part-00000
-rw-r--r-- 3 spark supergroup 21 2025-12-28 10:07 /user/spark/output-wordcount/part-00001
root@hadoop-master:/# hdfs dfs -cat /user/spark/output-wordcount/*
2025-12-28 10:20:47,341 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
(Hello,2)
(Spark,1)
(Hadoop,1)
root@hadoop-master:/#
D:\hadoop-spark>docker exec -it hadoop-master hdfs dfs -mkdir -p /input
D:\hadoop-spark>docker cp D:\hadoop-spark\purchases.txt hadoop-master:/root/purchases.txt
Successfully copied 2.05kB to hadoop-master:/root/purchases.txt

D:\hadoop-spark>docker exec -it hadoop-master hdfs dfs -put /root/purchases.txt /input
2025-12-30 11:32:00,836 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

D:\hadoop-spark>docker exec -it hadoop-master hdfs dfs -ls /input
Found 1 items
-rw-r--r-- 3 root supergroup 48 2025-12-30 11:32 /input/purchases.txt

D:\hadoop-spark>docker exec -it spark-master ls /opt/spark/work-dir
D:\hadoop-spark>docker cp D:\hadoop-spark\wordcount-java\target\wordcount-spark-1.0-SNAPSHOT.jar spark-master:/opt/spark/work-dir/wordcount-spark.jar
Successfully copied 5.63kB to spark-master:/opt/spark/work-dir/wordcount-spark.jar

D:\hadoop-spark>docker exec -it spark-master ls /opt/spark/work-dir
wordcount-spark.jar
```

The screenshot shows the IntelliJ IDEA interface with the following details:

- File Structure (Left):** The project is named "HADOOP-SPARK". It contains a "src/main/java" directory with "spark/batch/tp21" and "WordCountTask.java". There is also a "target" directory containing "wordcount-spark-1.0-SNAPSHOT.jar" and a "pom.xml" file.
- Editor (Top Right):** The file "pom.xml" is open. The code is as follows:

```
<project xmlns="http://maven.apache.org/POM/4.0.0"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
                           http://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>
```

- Terminal (Bottom):** The terminal window shows the output of a Maven build command. It includes dependency download logs and the final build output:

```
-compress-1.21.jar
Downloading from central: https://repo.maven.apache.org/maven2/org/snappy/snappy/0.4/snappy-0.4.jar
Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-io/3.4.0/plexus-io-3.4.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/maven-archiver/3.6.0/maven-archiver-3.6.0.jar (26 kB at 150 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.4.2/plexus-utils-3.4.2.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/snappy/snappy/0.4/snappy-0.4.jar (58 kB at 151 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-io/3.4.0/plexus-io-3.4.0.jar (79 kB at 179 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-archiver/4.4.0/plexus-archiver-4.4.0.jar (211 kB at 293 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.4.2/plexus-utils-3.4.2.jar (267 kB at 298 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-compress/1.21/commons-compress-1.21.jar (1.0 MB at 578 kB/s)
[WARNING] ARJ will be empty - no content was marked for inclusion!
[INFO] Building jar: /usr/src/mymaven/target/wordcount-spark-1.0-SNAPSHOT.jar
[INFO] ...
[INFO] BUILD SUCCESS
[INFO] ...
[INFO] Total time: 03:00 min
[INFO] Finished at: 2025-12-28T18:08:46Z
[INFO] ...
```

The screenshot shows the IntelliJ IDEA interface with the following details:

- File**, **Edit**, **Selection**, **View**, **Go**, **Run**, **...** menu bar.
- EXPLORER** tool window on the left showing the project structure:
 - HADOOP-SPARK
 - wordcount-streaming
 - src\main\java\spark\streaming\WordCountStreaming.java
 - target
 - classes
 - generated-sources
 - maven-archiver
 - maven-status
 - wordcount-streaming-1.0.jar
 - pom.xml
 - docker-compose.yml
 - purchases.txt
- EDITOR** tab showing `pom.xml` content:

```
<project xmlns="http://maven.apache.org/POM/4.0.0">
  ...
  ...
</project>
```
- PROBLEMS** tab showing build errors:

```
op-spark\wordcount-streaming\src\main\java\spark\streaming\tpl21\WordCountStreaming.java uses or overrides a deprecated API.
[INFO] /D:/hadoop-spark/wordcount-streaming/src/main/java/spark/streaming/tpl21/WordCountStreaming.java: Recompile with -Xlint:deprecation for details.
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ wordcount-streaming ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory D:/hadoop-spark\wordcount-streaming\src\test\resources
[INFO]
[INFO] --- compiler:3.13.0:testCompile (default-testCompile) @ wordcount-streaming ---
[INFO] No sources to compile
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ wordcount-streaming ---
[INFO] No tests to run.
[INFO]
[INFO] --- jar:3.4.1:jar (default-jar) @ wordcount-streaming ---
[INFO] Building jar: D:/hadoop-spark\wordcount-streaming\target\wordcount-streaming-1.0.jar
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 10.668 s
[INFO] Finished at: 2026-01-06T19:13:40+01:00
[INFO]
```
- TERMINAL** tab showing the command line output of the build process.
- STATUS BAR** at the bottom: Line 36, Col 1 | Spaces: 4 | UTF-8 | {} XML | Signed out

The screenshot shows the IntelliJ IDEA interface with the following details:

- File Structure (Left):** Shows the project structure under "HADOOP-SPARK". The "wordcount-spark" module is selected, revealing its contents: "src\main\java\spark\strea...", "WordCountStreaming.java", "target", "classes", "generated-sources", "maven-archiver", "maven-status", and "wordcount-streaming-1.0.jar". Other files like "pom.xml", "docker-compose.yml", and "purchases.txt" are also listed.
- Editor (Top Right):** Displays the "pom.xml" file content:

```
<project xmlns="http://maven.apache.org/POM/4.0.0">
</project>
```
- Toolbars and Tabs (Bottom):** Includes "PROBLEMS", "OUTPUT", "DEBUG CONSOLE", "TERMINAL", "PORTS", and "SPELL CHECKER".
- Terminal Output (Bottom Right):** Shows the Maven build logs:

```
[INFO] on the class path. A future release of javac may disable annotation processing
[INFO] unless at least one processor is specified by name (-processor), or a search
[INFO] path is specified (--processor-path, --processor-module-path), or annotation
[INFO] processing is enabled explicitly (-proc:only, -proc:full).
[INFO] Use -Xlint:-options to suppress this message.
[INFO] Use -proc:none to disable annotation processing.

[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ wordcount-spark ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO]
[INFO] skip non existing resourceDirectory D:\hadoop-spark\wordcount-spark\src\test\resources
[INFO]
[INFO] --- compiler:3.13.0:testCompile (default-testCompile) @ wordcount-spark ---
[INFO] No sources to compile
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ wordcount-spark ---
[INFO] No tests to run.
[INFO]
[INFO] --- jar:3.4.1:jar (default-jar) @ wordcount-spark ---
[INFO] Building jar: D:\hadoop-spark\wordcount-spark\target\wordcount-spark-1.0-SNAPSHOT.jar
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] -----
[INFO] Total time: 24.454 s
[INFO] Finished at: 2026-01-06T18:49:58+01:00
[INFO] -----
```



```

scala> df.createOrReplaceTempView("words_table")
scala> spark.sql("""
  SELECT word, COUNT(*) AS count
  FROM words_table
  GROUP BY word
""").show()
+-----+-----+
| word|count|
+-----+-----+
| Hello| 2|
| Spark| 1|
| Hadoop| 1|
+-----+-----+

scala> spark.sql("""
  SELECT word, COUNT(*) AS count
  FROM words_table
  GROUP BY word
  ORDER BY count DESC
""").show()
+-----+-----+
| word|count|
+-----+-----+
| Hello| 2|
| Spark| 1|
| Hadoop| 1|
+-----+-----+

scala> val resultDF = spark.sql("""
  SELECT word, COUNT(*) AS count
  FROM words_table
  GROUP BY word
""")
resultDF.write
  .mode("overwrite")
  .csv("hdfs://hadoop-master:9000/user/spark/output-sql")
  | resultDF: org.apache.spark.sql.DataFrame = [word: string, count: bigint]

scala> val textFile = sc.textFile("hdfs://hadoop-master:9000/input/file1.txt")
textFile: org.apache.spark.rdd.RDD[String] = hdfs://hadoop-master:9000/input/file1.txt MapPartitionsRDD[1] at textFile at <console>:23

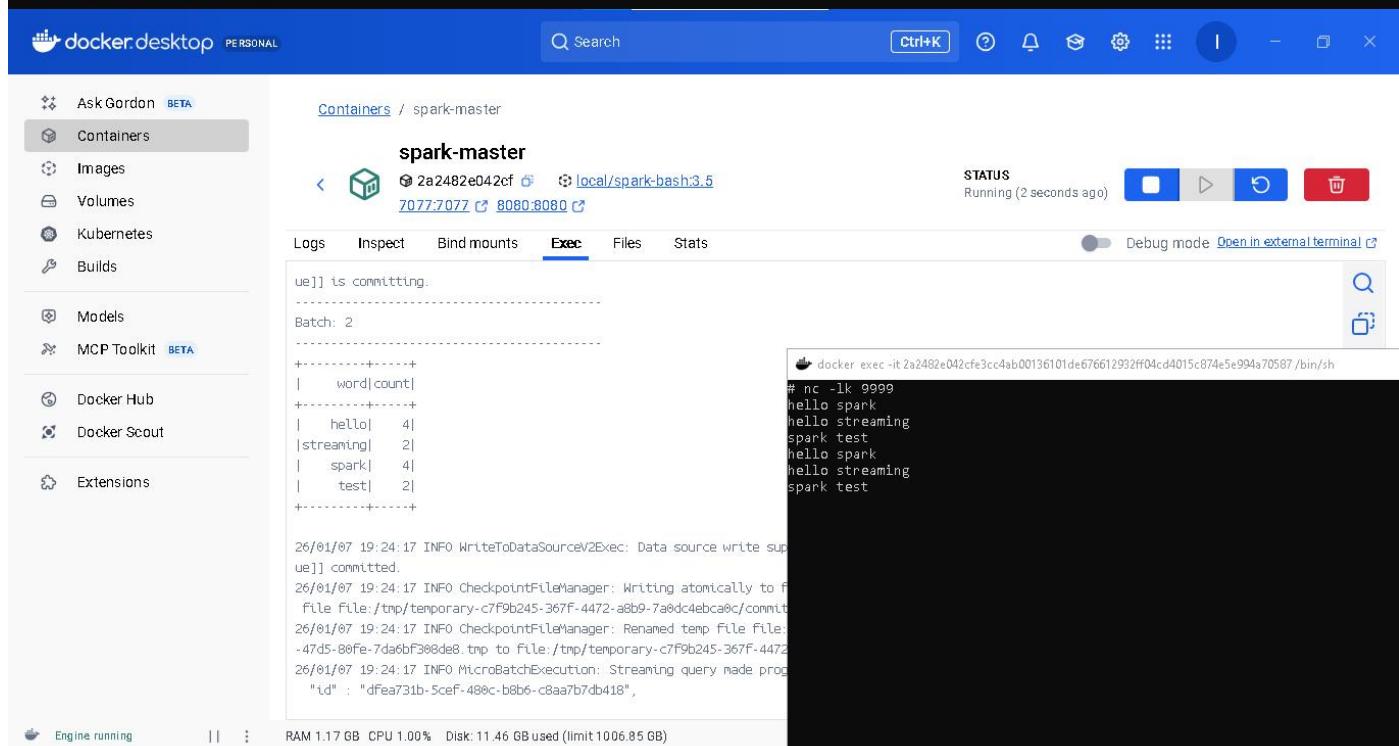
scala> val words = textFile.flatMap(_.split(" "))
words: org.apache.spark.rdd.RDD[String] = MapPartitionsRDD[2] at flatMap at <console>:23

scala> val pairs = words.map(word => (word, 1))
pairs: org.apache.spark.rdd.RDD[(String, Int)] = MapPartitionsRDD[3] at map at <console>:23

scala> val counts = pairs.reduceByKey(_ + _)
counts: org.apache.spark.rdd.RDD[(String, Int)] = ShuffledRDD[4] at reduceByKey at <console>:23

scala> counts.collect()
res1: Array[(String, Int)] = Array((Hello,2), (Spark,1), (Hadoop,1))

```



The screenshot shows the Hadoop All Applications interface. On the left, there's a sidebar with a yellow elephant logo and sections for Cluster Metrics, Cluster Nodes Metrics, Scheduler Metrics, and Tools. The main area displays "All Applications" with a table of application logs.

ID	User	Name	Application Type	Queue	Application Priority	StartTime	LaunchTime	FinishTime	State	FinalStatus	Running Containers	Allocated CPU Vcores	Allocated Memory MB	Reserved CPU Vcores	Reserved Memory MB	% Qu

No data available in table

Showing 0 to 0 of 0 entries

Overview 'hadoop-master:9000' (active)

Started:	Tue Dec 30 01:32:28 +0100 2025
Version:	3.2.1, rb3cbbb467e22ea829b3808f4b7b01d07e0bf3842
Compiled:	Tue Sep 10 16:56:00 +0100 2019 by rohithsharmaks from branch-3.2.1
Cluster ID:	CID-60987d1b-fd76-4e64-B272-49f9ebd04f6c
Block Pool ID:	BP-1299663019-172.18.0.3-1766773507936

Summary

Security is off.

Safemode is off.

19 files and directories, 6 blocks (6 replicated blocks, 0 erasure coded block groups) = 25 total filesystem object(s).

Heap Memory used 53.88 MB of 139 MB Heap Memory. Max Heap Memory is 860.5 MB.

Heap memory used: 60.00 MB of 100 MB heap memory. Max heap memory is 600.0 MB.

Image Captioning اشکالات x | Spark & Hadoop شیوه x | Namenode information x | localhost x | Spark Master at spark://172.18.0.2:7077 x + - ×

localhost:8080 Import favorites 0561339805 Gmail YouTube Traduire Update ... Chat

Spark 3.5.0

Spark Master at spark://172.18.0.2:7077

URL: spark://172.18.0.2:7077

Alive Workers: 1

Cores in use: 4 Total, 0 Used

Memory in use: 2.8 GiB Total, 0.0 B Used

Resources in use:

Applications: 0 Running, 0 Completed

Drivers: 0 Running, 0 Completed

Status: ALIVE

Workers (1)

Worker Id	Address	State	Cores	Memory	Resources
worker-20251226182514-172.18.0.4-40125	172.18.0.4:40125	ALIVE	4 (0 Used)	2.8 GiB (0.0 B Used)	

Running Applications (0)

Application ID	Name	Cores	Memory per Executor	Resources Per Executor	Submitted Time	User	State	Duration
----------------	------	-------	---------------------	------------------------	----------------	------	-------	----------

Completed Applications (0)

Application ID	Name	Cores	Memory per Executor	Resources Per Executor	Submitted Time	User	State	Duration
----------------	------	-------	---------------------	------------------------	----------------	------	-------	----------