

DSC 650
Inman, Gracie
Week 2
03/24/24

Exercise 2

HDFS Report

```
gracieinman@big-data-week1-instances:~/dsc650-infra-main/bellevue-bigdata/hadoop-hive-spark-hbase$ docker-compose exec master bash
bash-5.0# hdfs dfsadmin -report
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.10.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 01:53:58,831 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Configured Capacity: 18367802368 (96.55 GB)
Present Capacity: 7897721228 (73.55 GB)
DFS Remaining: 7897662976 (73.55 GB)
DFS Used: 49152 (48 KB)
DFS Used%: 0.00%
Replicated Blocks:
  Under replicated blocks: 0
  Blocks with corrupt replicas: 0
  Missing blocks: 0
  Missing blocks (with replication factor 1): 0
  Low redundancy blocks with highest priority to recover: 0
  Pending deletion blocks: 0
Erasure Coded Block Groups:
  Low redundancy block groups: 0
  Block groups with corrupt internal blocks: 0
  Missing block groups: 0
  Low redundancy blocks with highest priority to recover: 0
  Pending deletion blocks: 0

-----
Live datanodes (2):
Name: 172.28.1.2:9866 (worker1)
Hostname: worker1
Decommission Status : Normal
Configured Capacity: 51835101184 (48.28 GB)
DFS Used: 24576 (24 KB)
Non DFS Used: 12329467984 (11.48 GB)
DFS Remaining: 39488831488 (36.78 GB)
DFS Used%: 0.00%
DFS Remaining%: 76.18%
Configured Cache Capacity: 0 (0 B)
Cache Used: 0 (0 B)
Cache Remaining: 0 (0 B)
Cache Used%: 100.00%
Cache Remaining%: 0.00%
XorSivers: 1
Last contact: Wed Mar 20 01:53:57 GMT 2024
Last Block Report: Wed Mar 20 01:53:24 GMT 2024
Num of Blocks: 0

Name: 172.28.1.3:9866 (worker2)
Hostname: worker2
Decommission Status : Normal
Configured Capacity: 51835101184 (48.28 GB)
DFS Used: 24576 (24 KB)
Non DFS Used: 12329467984 (11.48 GB)
DFS Remaining: 39488831488 (36.78 GB)
DFS Used%: 0.00%
DFS Remaining%: 76.18%
Configured Cache Capacity: 0 (0 B)
Cache Used: 0 (0 B)
Cache Remaining: 0 (0 B)
Cache Used%: 100.00%
Cache Remaining%: 0.00%
```

Load grades.csv

```
Xceivers: 1
Last contact: Wed Mar 20 01:53:57 GMT 2024
Last Block Report: Wed Mar 20 01:53:24 GMT 2024
Num of Blocks: 0

bash-5.0# ls/data
bash: ls/data: No such file or directory
bash-5.0# ls /data
batches grades.csv input.txt output.txt ssn-address.tsv
bash-5.0# hdfs dfs -put /data/grades.csv /
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.10.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 01:56:20.351 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
bash-5.0# hdfs dfs -ls /
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.10.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 01:57:03.491 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 7 items
-rw-r--r-- 1 root supergroup 747 2024-03-20 01:56 /grades.csv
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /hbase
drwxr-xr-x - root supergroup 0 2024-03-20 01:54 /log
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /spark-jars
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /tez
drwxr-xr-x - root supergroup 0 2024-03-20 01:54 /tmp
drwxrwx--- - root supergroup 0 2024-03-20 01:55 /user
bash-5.0#
```

Workers 1 + 2

```
grecinman@big-data-week1-instance:~/dsc650-infra-main/bellvue-bigdata/hadoop-hive-spark-hbase$ docker-compose exec worker1 bash
bash-5.0# hdfs dfs -ls /
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.10.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 02:05:52.268 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 7 items
-rw-r--r-- 1 root supergroup 747 2024-03-20 01:56 /grades.csv
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /hbase
drwxr-xr-x - root supergroup 0 2024-03-20 01:54 /log
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /spark-jars
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /tez
drwxr-xr-x - root supergroup 0 2024-03-20 01:54 /tmp
drwxrwx--- - root supergroup 0 2024-03-20 01:55 /user
bash-5.0# exit
exit
grecinman@big-data-week1-instance:~/dsc650-infra-main/bellvue-bigdata/hadoop-hive-spark-hbase$ docker-compose exec worker2 bash
bash-5.0# hdfs dfs -ls /
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.10.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 02:07:13.148 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 7 items
-rw-r--r-- 1 root supergroup 747 2024-03-20 01:56 /grades.csv
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /hbase
drwxr-xr-x - root supergroup 0 2024-03-20 01:54 /log
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /spark-jars
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /tez
drwxr-xr-x - root supergroup 0 2024-03-20 01:54 /tmp
drwxrwx--- - root supergroup 0 2024-03-20 01:55 /user
bash-5.0# exit
exit
grecinman@big-data-week1-instance:~/dsc650-infra-main/bellvue-bigdata/hadoop-hive-spark-hbase$
```

-help

```
exit
[gracie@inman0big-data-week1-instance:~/dsc650-infra-main/bellevue-bigdata/hadoop-hive-spark-hbase]$ docker-compose exec master bash
bash-5.0# hdfs dfs -help
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.10.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 02:10:40,281 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Usage: hadoop fs [generic options]
[-appendToFile <localsrc> ... <dst>]
[-cat [-ignoreCrc] <src> ...]
[-checksum <src> ...]
[-chgrp [-R] GROUP PATH...]
[-chmod [-R] <MODE[,MODE]...> [OCTALMODE] PATH...]
[-chown [-R] [OWNER][:(GROUP)] PATH...]
[-copyFromLocal [-f] [-p] [-l] [-d] [-t <thread count>] [-q <thread pool queue size>] <localsrc> ... <dst>]
[-copyToLocal [-f] [-p] [-crc] [-ignoreCrc] [-t <thread count>] [-q <thread pool queue size>] <src> ... <localdst>]
[-count [-q] [-h] [-v] [-t <storage type>] [-u] [-x] [-e] <paths> ...]
[-cp [-f] [-p] [-p[toponly]] [-d] [-t <thread count>] [-q <thread pool queue size>] <src> ... <dst>]
[-createSnapshot <snapshotDir> [<snapshotName>]]
[-deleteSnapshot <snapshotDir> [<snapshotName>]]
[-df [-l] <paths> ...]
[-du [-s] [-h] [-v] [-x] <paths> ...]
[-expunge [-immediate]]
[-find <paths> ... <expression> ...]
[-get [-f] [-p] [-crc] [-ignoreCrc] [-t <thread count>] [-q <thread pool queue size>] <src> ... <localdst>]
[-getfacl [-R] <paths>]
[-getfattr [-R] [-n name [-d] [-e en]] <paths>]
[-getmerge [-nl] [--skip-empty-file] <src> <localdst>]
[-head <files>]
[-help [cmd ...]]
[-ls [-C] [-d] [-h] [-q] [-R] [-t] [-S] [-r] [-u] [-e] [<paths> ...]]
[-mkdir [-p] <paths> ...]
[-moveFromLocal [-f] [-p] [-l] [-d] <localsrc> ... <dst>]
[-moveToLocal <src> <localdst>]
[-mv <src> ... <dst>]
[-put [-f] [-p] [-l] [-q] [-t <thread count>] [-q <thread pool queue size>] <localsrc> ... <dst>]
[-renameSnapshot <snapshotDir> <oldName> <newName>]
[-rm [-f] [-r] [-R] [--skipTrash] [--safely] <src> ...]
[-rmdir [--ignore-fail-on-non-empty] <dir> ...]
[-setfacl [-R] [(f|b|k) (-m|-x <acl_spec>) <paths>][[(-set <acl_spec>) <paths>]]]
[-setfattr [-n name [-v value] [-x name] <paths>]
[-setrep [-R] [-w] <rep> <paths> ...]
[-stat [format] <paths> ...]
[-tail [-F] [-s <sleep interval>] <files>]
[-text [-defer] <paths>]
[-text [-ignoreCrc] <src> ...]
[-touch [-a] [-m] [-t TIMESTAMP (yyyyMMdd:HHmmss) ] [-c] <paths> ...]
[-touchz <paths> ...]
[-truncate [-w] <length> <paths> ...]
[-usage [cmd ...]]

-appendToFile <localsrc> ... <dst> :
Appends the contents of all the given local files to the given dst file. The dst
file will be created if it does not exist. If <localSrc> is -, then the input is
read from stdin.

-cat [-ignoreCrc] <src> ... :
Fetch all files that match the file pattern <src> and display their content on
stdout.

-checksum <src> ... :
Dump checksum information for files that match the file pattern <src> to stdout.
```

Three additional Commands

- head

```
bash-5.0# hdfs dfs -cat /grades.csv | head
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.10.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 03:00:19,286 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Last name,First name,SSN,Test1,Test2,Test3,Test4,Final,Grade
Alfalte,Aloysius,123-45-0789,40,90,100,83,40,D-
Alfred,University,123-12-1234,41,97,96,97,48,D+
Gerty,Grama,567-89-0123,41,88,60,40,44,C
Android,Electric,007-00-1321,42,73,36,45,47,B-
Bumpkin,Fred,456-78-9012,43,78,88,77,45,A-
Rubble,Betty,234-56-7890,44,90,80,90,46,C-
Nashow,Cecil,345-67-8901,45,11,-1,4,43,F
Buff,Bif,632-79-9939,46,20,30,48,50,B+
Airumo,Andrew,223-45-0789,40,5,90,100,53,A
```

- create, rename, and delete a directory.

```
bash-5.0# hdfs dfs -mkdir /testdirectory
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 03:08:02,634 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
bash-5.0# hdfs dfs -ls /
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 03:08:28,778 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 8 items
-rw-r--r-- 1 root supergroup 747 2024-03-20 01:56 /grades.csv
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /hbase
drwxr-xr-x - root supergroup 0 2024-03-20 01:54 /log
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /spark-jars
drwxr-xr-x - root supergroup 0 2024-03-20 03:05 /testdirectory
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /tmp
drwxr-xr-x - root supergroup 0 2024-03-20 01:54 /user
drwxrwx--- root supergroup 0 2024-03-20 01:56 /user
bash-5.0# hdfs dfs -mv /testdirectory /test-directory
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 03:08:43,391 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
bash-5.0# hdfs dfs -ls /
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 03:08:51,316 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 8 items
-rw-r--r-- 1 root supergroup 747 2024-03-20 01:56 /grades.csv
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /hbase
drwxr-xr-x - root supergroup 0 2024-03-20 01:54 /log
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /spark-jars
drwxr-xr-x - root supergroup 0 2024-03-20 03:05 /test-directory
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /tmp
drwxrwx--- root supergroup 0 2024-03-20 01:56 /user
drwxrwx--- root supergroup 0 2024-03-20 01:56 /user
bash-5.0# hdfs dfs -rm -f /test-directory
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 03:09:02,651 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Deleted /test-directory
bash-5.0# hdfs dfs -ls /
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-20 03:09:30,820 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 7 items
-rw-r--r-- 1 root supergroup 747 2024-03-20 01:56 /grades.csv
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /hbase
drwxr-xr-x - root supergroup 0 2024-03-20 01:54 /log
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /spark-jars
drwxr-xr-x - root supergroup 0 2024-03-20 01:55 /tmp
drwxrwx--- root supergroup 0 2024-03-20 01:54 /user
drwxrwx--- root supergroup 0 2024-03-20 01:55 /user
bash-5.0#
```

Yarn List

```
hadoop-hive-spark-hbase_worker2.1 is up-to-date
hadoop-hive-spark-hbase_worker1.1 is up-to-date
hadoop-hive-spark-hbase_master.1 is up-to-date
ipsec@ipsecm01big-data-week11-instance1:~/dc050-infra-main/bellevue-bigdata/hadoop-hive-spark-hbase$ docker-compose exec master bash
bash-5.0# yarn node -list
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/tez/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hive/lib/log4j-slf4j-impl-2.10.0.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
2024-03-24 04:05:48,351 INFO client.RMPProxy: Connecting to ResourceManager at master/172.28.1.1:8032
Total Nodes:2
Node-Id Node-State Node-Http-Address Number-of-Running-Containers
worker1:41881 RUNNING worker1:8042 0
worker2:44011 RUNNING worker2:8042 0
bash-5.0#
```

Updated Memory

The screenshot displays the Hadoop 3.3.6 web interface. The browser's address bar shows 'localhost:8088/cluster'. The left sidebar contains navigation links: Cluster, About, Nodes, Node Labels, Applications, NEW, NEW SAVING, SUBMITTED, ACCEPTED, RUNNING, FINISHED, FAILED, KILLED, and Scheduler. The main content area displays various metrics tables: Cluster Metrics, Cluster Nodes Metrics, User Metrics for dr.who, and Scheduler Metrics. The Scheduler Metrics table shows a 'Fair Scheduler' with 0 applications. A message at the bottom states 'No data available in table'.

MapReduce

```

2024-03-24 21:47:50.396 INFO mapreduce.Job: Counters: 55
File System Counters
    FILE: Number of bytes read=58
    FILE: Number of bytes written=738258
    FILE: Number of read operations=0
    FILE: Number of large read operations=0
    FILE: Number of write operations=0
    HDFS: Number of bytes read=522
    HDFS: Number of bytes written=215
    HDFS: Number of read operations=13
    HDFS: Number of large read operations=0
    HDFS: Number of write operations=3
    HDFS: Number of bytes read erasure-coded=0
Job Counters
    Launched map tasks=2
    Launched reduce tasks=1
    Data-local map tasks=1
    Rack-local map tasks=1
    Total time spent by all maps in occupied slots (ms)=224496
    Total time spent by all reduces in occupied slots (ms)=14888
    Total time spent by all map tasks (ms)=11203
    Total time spent by all reduce tasks (ms)=3722
    Total vcore-milliseconds taken by all map tasks=11203
    Total vcore-milliseconds taken by all reduce tasks=3722
    Total megabyte-milliseconds taken by all map tasks=11471872
    Total megabyte-milliseconds taken by all reduce tasks=7622656
Map-Reduce Framework
    Map input records=2
    Map output records=4
    Map output bytes=36
    Map output materialized bytes=56
    Input split bytes=286
    Combine input records=0
    Combine output records=0
    Reduce input groups=2
    Reduce shuffle bytes=56
    Reduce input records=4
    Reduce output records=0
    Spilled Records=8
    Shuffled Maps =2
    Failed Shuffles=0
    Merged Map outputs=2
    GC time elapsed (ms)=251
    CPU time spent (ms)=2180
    Physical memory (bytes) snapshot=747966464
    Virtual memory (bytes) snapshot=7861262336
    Total committed heap usage (bytes)=666894336
    Peak Map Physical memory (bytes)=286072832
    Peak Map Virtual memory (bytes)=2354607520
    Peak Reduce Physical memory (bytes)=183091200
    Peak Reduce Virtual memory (bytes)=2355122176
Shuffle Errors
    BAD_ID=0
    CONNECTION=0
    IO_ERROR=0
    WRONG_LENGTH=0
    WRONG_MAP=0
    WRONG_REDUCE=0
File Input Format Counters
    Bytes Read=236
File Output Format Counters
    Bytes Written=97
Job Finished in 32.536 seconds
Estimated value of Pi is 3.80000000000000000000
bash-5.0#
```

The Monte Carlo method was used to estimate PI. The estimated value of PI is 3.800. There are 2 mapper tasks and 10 samples per task. The significance of this exercise was to show how MapReduce was able to perform the computational task by splitting the computation to allow it to process a large calculation easily.