Hadoop Installation Guide and HDFS Hands On - H1

Every step is to be executed on the home directory. Use `cd` to move to home directory.

The commands in the guide use `USER` as the notation for your username. If you have executed A0 correctly, then this should be your SRN in lowercase. This is important since the auto-evaluation depends on it. Verify your username by running `whoami` on the terminal.

Change any `/home/USER/` to `/home/<your SRN>/`

This manual includes steps that you will be doing in the classroom. It assumes that you have completed the downloads and installation steps 1-2 from your home which was emailed earlier. If you have not completed these steps, then click here to do so.

Execute the following commands to move to the home directory and updating the package list and the system. This guide assumes that you are working with Ubuntu or a Debian based distribution.

```
cd
sudo apt update -y
sudo apt upgrade -y
```

Step number continues from the H1_HOME manual.

Step 3 - Format HDFS NameNode

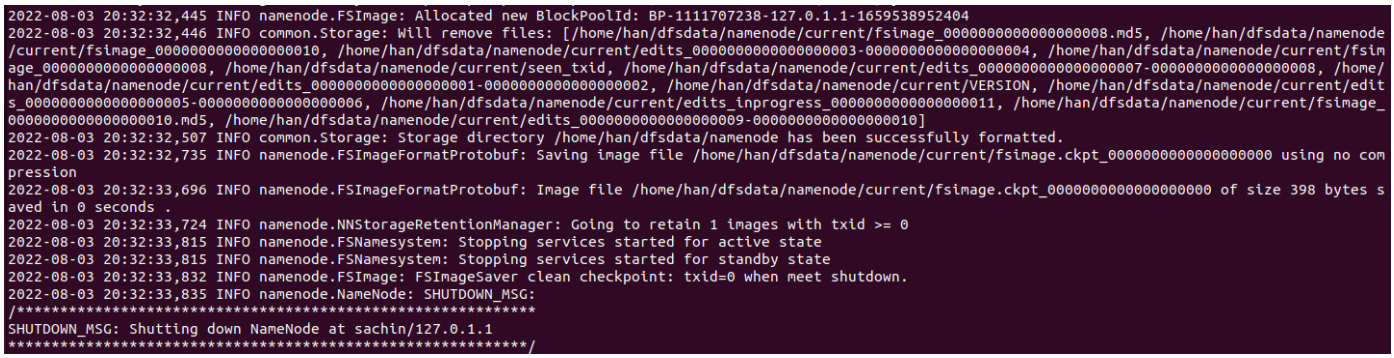
Before starting Hadoop for the first time, the namenode must be formatted. Use the following command.

```
hdfs namenode -format
```

A `SHUTDOWN` message will signify the end of the formatting process.

If you have reached this stage, it signifies that you have successfully installed hadoop.

Take a screenshot of the terminal output indicating the shutdown message and name it 3a.png.



Step 4 - Starting Hadoop

Navigate to the `hadoop` folder and execute the following commands. `start-all.sh` is a shell script that is used to start all the processes that hadoop requires.

```
cd
cd hadoop-3.3.3/sbin/
./start-all.sh
```

Type `jps` to find all the Java Processes started by the shell script. You should see a total of 6 processes, including the `jps` process. Note that the order of the items and the process IDs will be different.

```
2994 DataNode
3219 SecondaryNameNode
3927 Jps
3431 ResourceManager
2856 NameNode
3566 NodeManager
```

Take a screenshot of the terminal output and name it 4a.png.

```
han@sachin:~/hadoop-3.3.3/sbin$ ./start-all.sh
WARNING: Attempting to start all Apache Hadoop daemons as han in 10 seconds.
WARNING: This is not a recommended production deployment configuration.
WARNING: Use CTRL-C to abort.
Starting namenodes on [localhost]
Starting datanodes
Starting secondary namenodes [sachin]
Starting resourcemanager
Starting nodemanagers
han@sachin:~/hadoop-3.3.3/sbin$ jps
5652 NodeManager
4116 NameNode
6070 Jps
5496 ResourceManager
4395 DataNode
5183 SecondaryNameNode
han@sachin:~/hadoop-3.3.3/sbin$
```

Step 5 - Accessing Hadoop from the Browser

You can access Hadoop on `localhost` on the following ports

- NameNode - http://localhost:9870
- DataNode - http://localhost:9864
- YARN Manager - http://localhost:8088

Step 6 - Hadoop Examples

We will be using the Wordcount example to demonstrate the usage of Hadoop. Create a text file named `input.txt` with any content you want. Next, we will put this to the HDFS folder `/example` with the following command.

```
hdfs dfs -mkdir /example
hdfs dfs -put input.txt /example
```

Run the following command for the wordcount example.

```
hadoop jar $HADOOP_HOME/share/hadoop/mapreduce/hadoop-mapreduce-
examples-3.3.3.jar wordcount /example/input.txt /example/output
```

You can check the output with the following command.

```
hdfs dfs -cat /example/output/part-r-00000
```

Take a screenshot of the terminal output and name it 6a.png.

```
han@sachin:~/Desktop$ hdfs dfs -cat /example/output/part-r-00000
a       1
big     1
can     1
data    1
hadoop  2
hdfs    2
hello.  1
is      2
map     1
reduce  1
run     1
this    1
tool    1
we      1
with    1
han@sachin:~/Desktop$
```

Step 7 - Running Custom WordCount

Now, we will run a sample HDFS commmand to calculate the frequency of a particular word in a text file using our own mapper and reducer files.

Firstly, clone the GitHub repository.

```
git clone https://github.com/Cloud-Computing-Big-Data/UE20CS322-H1.git
```

This repo contains a sample mapper, reducer and a dataset file named tech.txt. Run the following commands to setup HDFS directories and copy the dataset file to the HDFS.

```
cd UE20CS322-H1/
hdfs dfs -mkdir /handson
hdfs dfs -put tech.txt /handson
chmod +x *.py
```

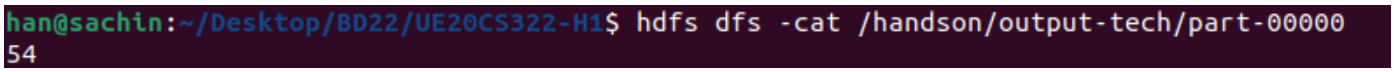
Next, run the following command to run the wordcount program.

```
hadoop jar /home/USER/hadoop-3.3.3/share/hadoop/tools/lib/hadoop-
streaming-3.3.3.jar \
    -mapper "$PWD/mapper.py" \
    -reducer "$PWD/reducer.py 'perseus'" \
    -input /handson/tech.txt \
    -output /handson/output-tech
```

To check the output, execute the following command.

```
hdfs dfs -cat /handson/output-tech/part-00000
```

Take a screenshot of the terminal output and name it 7a.png.



Step 8 - Auto-evaluation

Auto-evaluation is allowed only once. So make sure you have the following checklist ticked before proceeding.

- ◯ JPS has 6 processes(including the JPS process)
- ◯ Step 7 - Running Custom WordCount - Output is correct

For RR campus students, run the following command

```
python3 eval-rr.pyc
```

For EC campus students, run the following command

```
python3 eval-ec.pyc
```

You can see your score in the terminal output after the program finishes.

To stop all processes when you are done with your work, execute the following command.

```
cd
cd hadoop-3.3.3/sbin/
./stop-all.sh
```

Step 9 - Final Assessment

Make a word document with all the screenshots from HOME and in-person sessions.
Your file should be named with the format `PES1UG20CS999.pdf` with your SRN.

Submission link for RR Campus: here

Submission link for EC Campus: here