IT8711 FOSS AND CLOUD COMPUTING LABORATORY

ROLL NUMBER: 19UITE010 **REGISTER NO: 920419205040**

NAME: SHYAMALA.M **EXERCISE NO: 9**

Installation of Single Node Hadoop Cluster

PROCEDURAL STEPS

Step 1: Download the following Packages

1. hadoop-3.2.2.tar.gz
   Link: https://www.apache.org/dyn/closer.cgi/hadoop/common/hadoop-3.2.2/hadoop-3.2.2.tar.gz
2. 7zip to unzip the tar.gz file
   Link: https://www.7-zip.org/download.html
3. Java 8 (JDK-8U333 & JRE-8U333)
   Link: https://www.oracle.com/java/technologies/javase/javase8u211-later-archive-downloads.html
4. Hadoop dll Files
   Link: https://github.com/cdarlint/winutils/archive/refs/heads/master.zip
5. hadoop-hdfs-3.2.2.jar
   Link: https://jar-download.com/artifacts/org.apache.hadoop/hadoop-hdfs/3.2.2/source-code

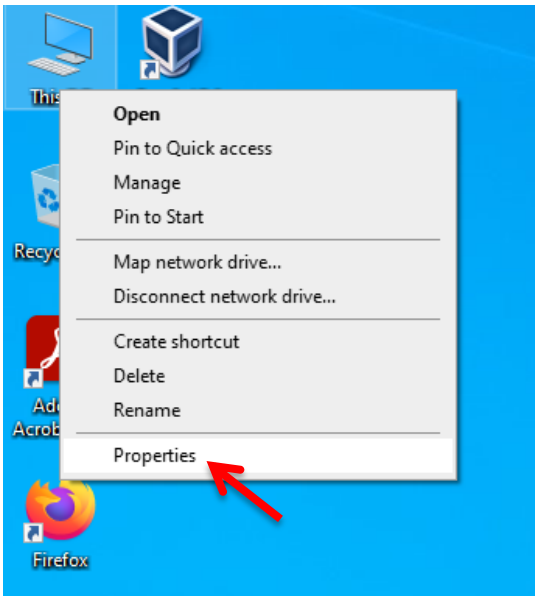
Step 2: Install / Extract the following Packages:

1. Install Java 8 in the location **c:\JAVA**. Also create two folders namely **"jdk1.8.0_333"** and **"jre1.8.0_333"**.
2. Create a folder **"hadoop-env"** in **D:**
3. Paste the downloaded "hadoop-3.2.2.tar.gz" into "d:\ hadoop-env"
4. Unzip the "hadoop-3.2.2.tar.gz" using 7zip (do the unzip function two times)
5. Copy the downloaded Hadoop dll files to the location "D:\hadoop-env\hadoop-3.2.2\bin"

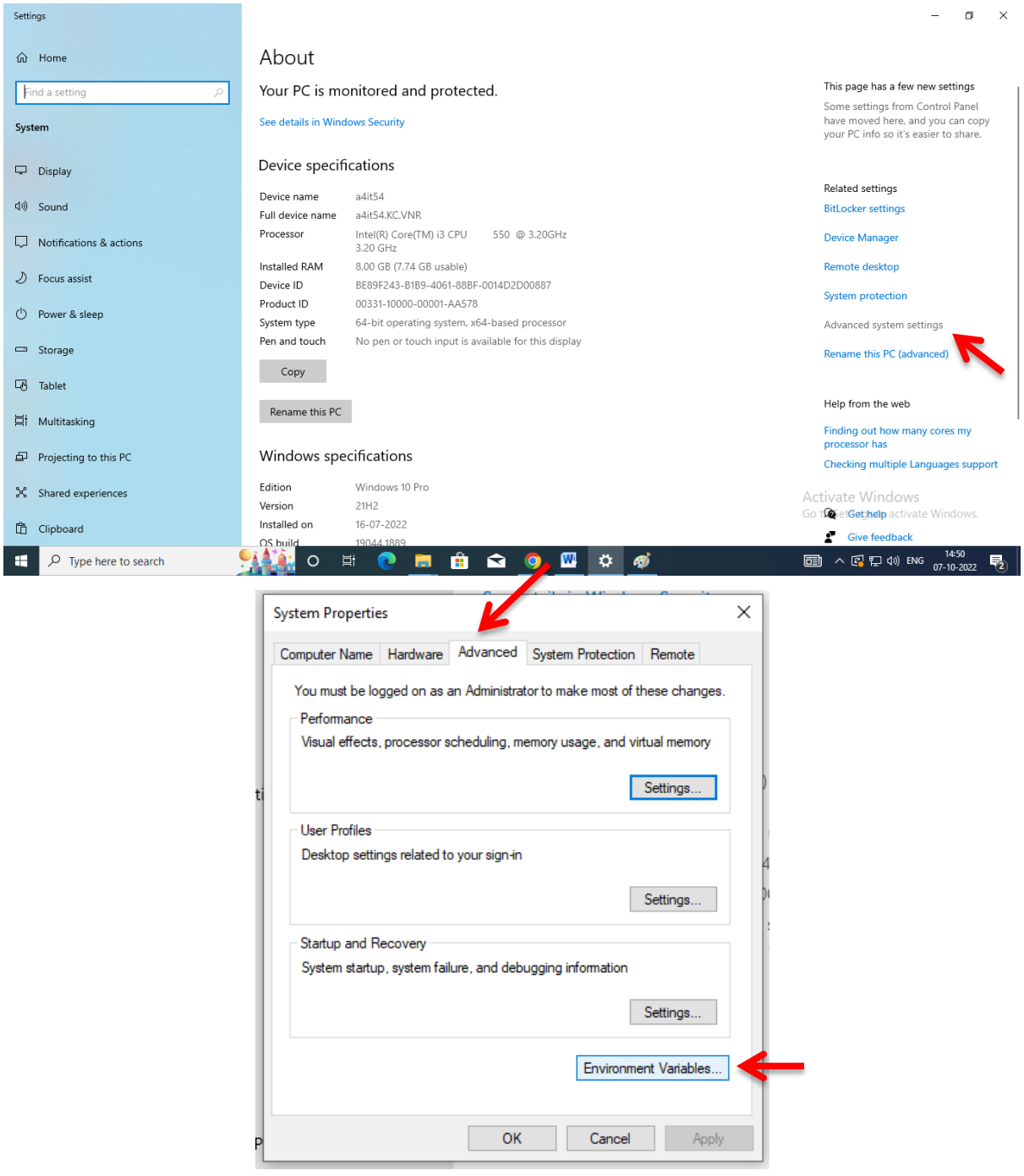
6. Copy the downloaded hadoop-hdfs-3.2.2.jar to “D:\hadoop-env\hadoop-3.2.2\share\hadoop\hdfs”
7. Edit the JAVA_HOME = C:\JAVA\jdk1.8.0_333 in the path “**D:\hadoop-env\hadoop-3.2.2\etc\hadoop\hadoop-env.cmd**

Step 3: Set the path for Java and Hadoop in system environment variables

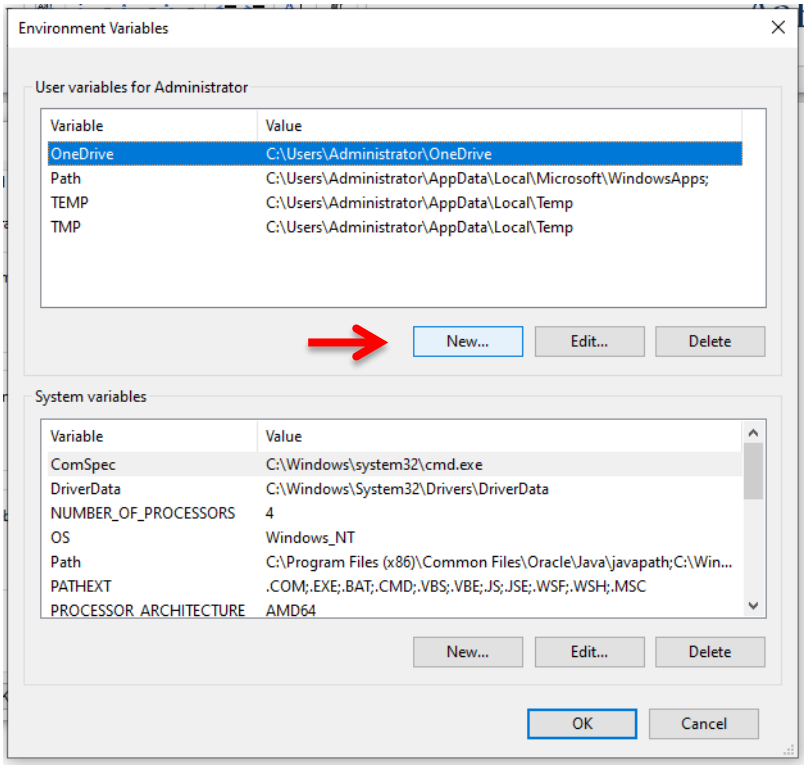
To edit environment variables, go to Control Panel → System and Security → System (or) right-click “This PC” → Properties (My Computer icon) and click on the “Advanced system settings” link.



When the “Advanced system settings” dialog appears, go to the “Advanced” tab and click on the “Environment variables” button located on the bottom of the dialog.

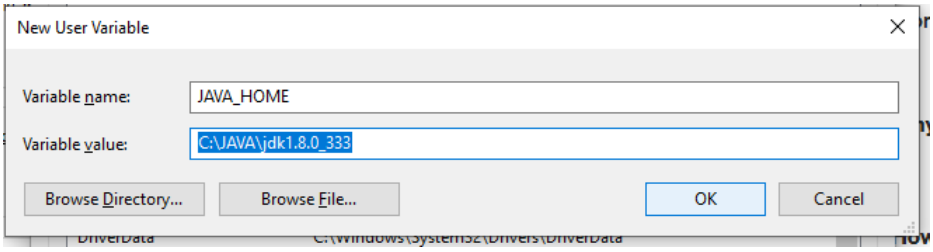


In the “Environment Variables” dialog, press the “New” button to add a new variable.

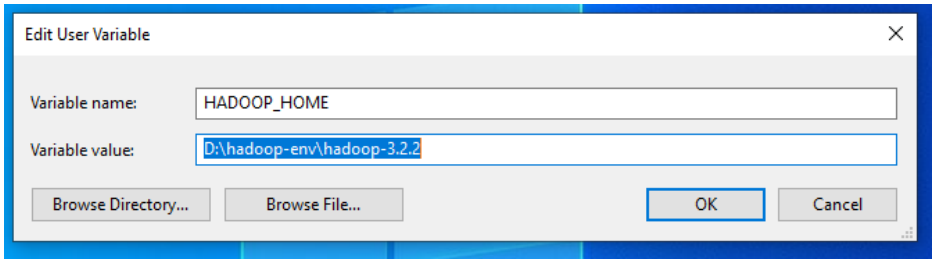


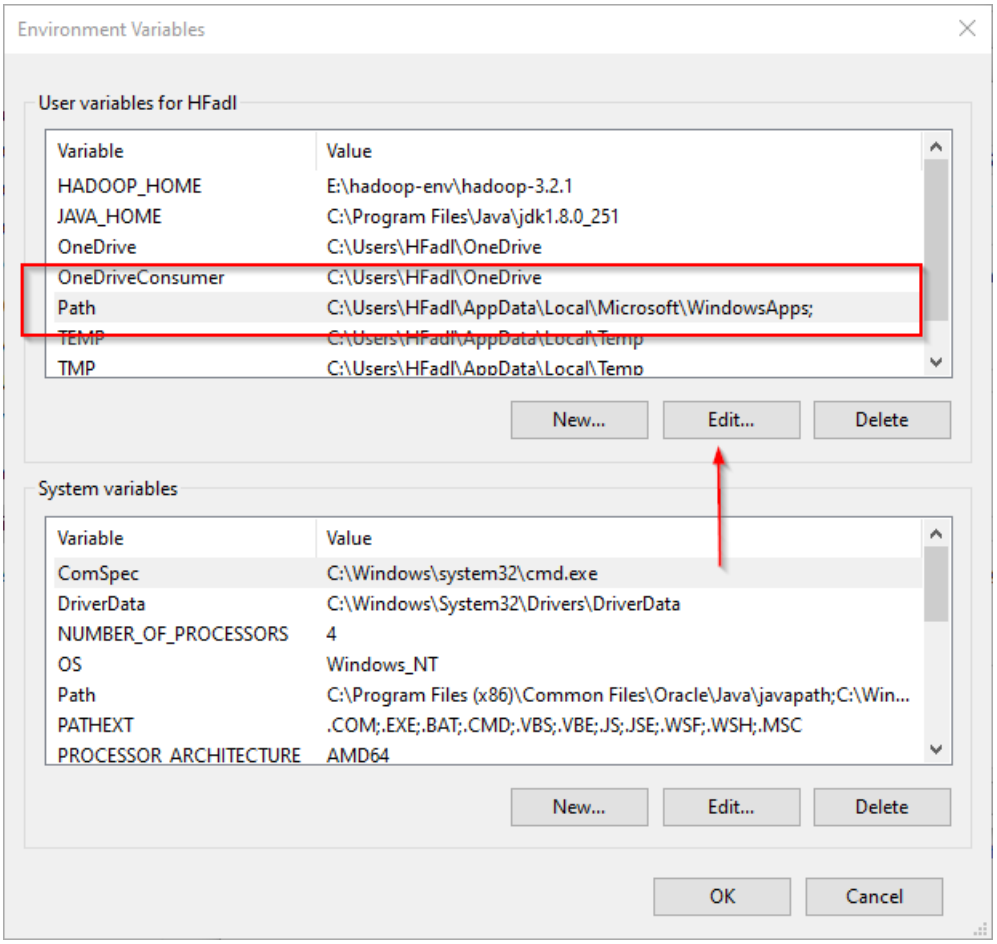
Now, Edit the PATH variable to add the Java and Hadoop binaries paths as shown in the following screenshots.

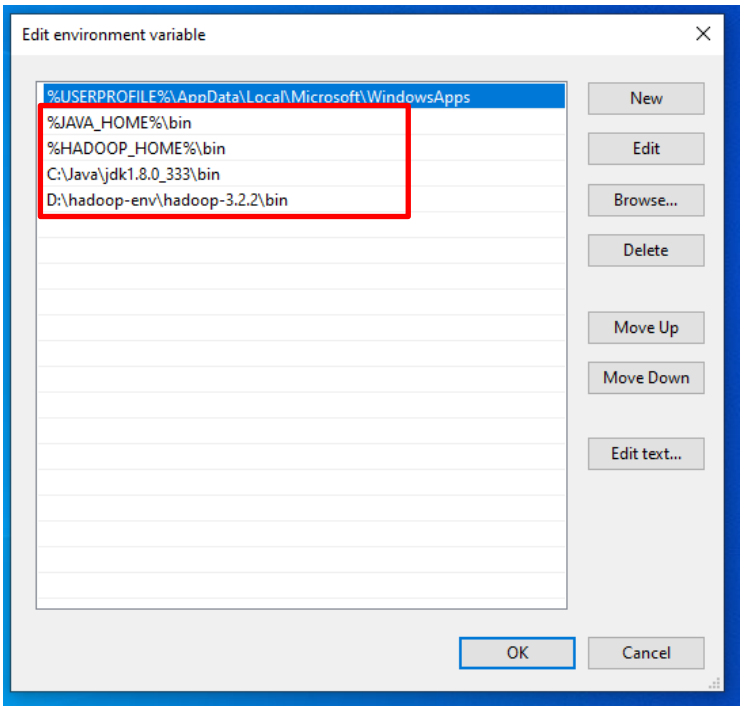
JAVA_HOME: JDK installation folder path



HADOOP_HOME: Hadoop installation folder path

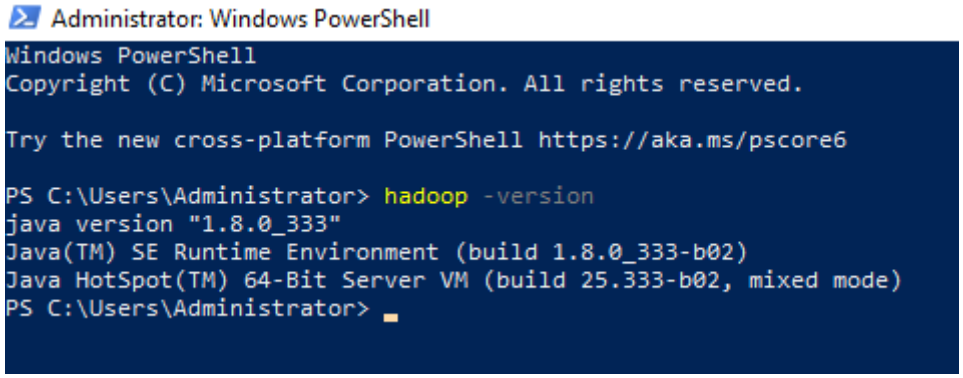



Environment Variables
User variables for HFadl
Variable
Value
HADOOP_HOME
E:\hadoop-env\hadoop-3.2.1
JAVA_HOME
C:\Program Files\Java\jdk1.8.0_251
OneDrive
C:\Users\HFadl\OneDrive
OneDriveConsumer
C:\Users\HFadl\OneDrive
Path
C:\Users\HFadl\AppData\Local\Microsoft\WindowsApps;
TEMP
C:\Users\HFadl\AppData\Local\Temp
TMP
C:\Users\HFadl\AppData\Local\Temp
New...
Edit...
Delete
System variables
Variable
Value
ComSpec
C:\Windows\system32\cmd.exe
DriverData
C:\Windows\System32\Drivers\DriverData
NUMBER_OF_PROCESSORS
4
OS
Windows_NT
Path
C:\Program Files (x86)\Common Files\Oracle\Java\javapath;C:\Win...
PATHEXT
.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
PROCESSOR_ARCHITECTURE
AMD64
New...
Edit...
Delete
OK
Cancel


Edit environment variable
%USERPROFILE%\AppData\Local\Microsoft\WindowsApps
%JAVA_HOME%\bin
%HADOOP_HOME%\bin
C:\Java\jdk1.8.0_333\bin
D:\hadoop-env\hadoop-3.2.2\bin
New
Edit
Browse...
Delete
Move Up
Move Down
Edit text...
OK
Cancel

Step 4: Open Command Prompt as Administrator and run the following command:

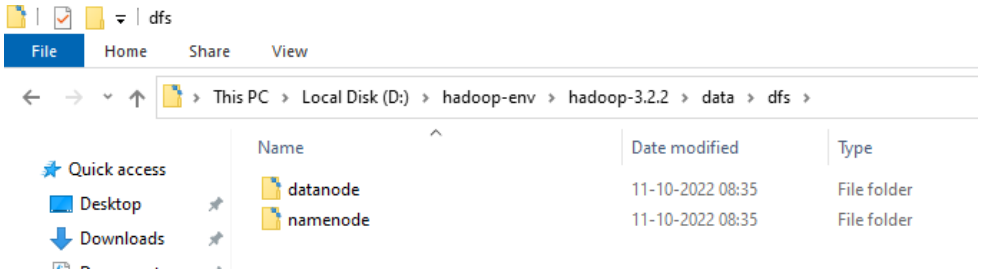
hadoop –version



Step 4: Create the following folders

D:\hadoop-env\hadoop-3.2.2**data\dfs\namenode**

D:\hadoop-env\hadoop-3.2.2**data\dfs\datanode**



Step 5: Configuring Hadoop cluster

There are **four files** to configure Hadoop cluster:

Location of the File: **"D:\hadoop-env\hadoop-3.2.2\etc\hadoop"**

File Name: "hdfs-site.xml"

Add the following properties within the <configuration></configuration> element:

<property>

<name>dfs.replication</name>

<value>1</value>

</property>

<property>

<name>dfs.namenode.name.dir</name>

*<value>**file:///D:/hadoop-env/hadoop-3.2.2/data/dfs/namenode**</value>*

</property>

<property>

<name>dfs.datanode.data.dir</name>

*<value>**file:///D:/hadoop-env/hadoop-3.2.2/data/dfs/datanode**</value>*

</property>

File Name: "core-site.xml"

Add the following properties within the <configuration></configuration> element:

<property>

<name>fs.default.name</name>

*<value>**hdfs://localhost:9820**</value>*

</property>

File Name: "mapred-site.xml"

Add the following properties within the <configuration></configuration> element:

<property>

<name>mapreduce.framework.name</name>

<value>yarn</value>

<description>MapReduce framework name</description>

</property>

File Name: "yarn-site.xml"

Add the following properties within the <configuration></configuration> element:

<property>

<name>yarn.nodemanager.aux-services</name>

<value>mapreduce_shuffle</value>

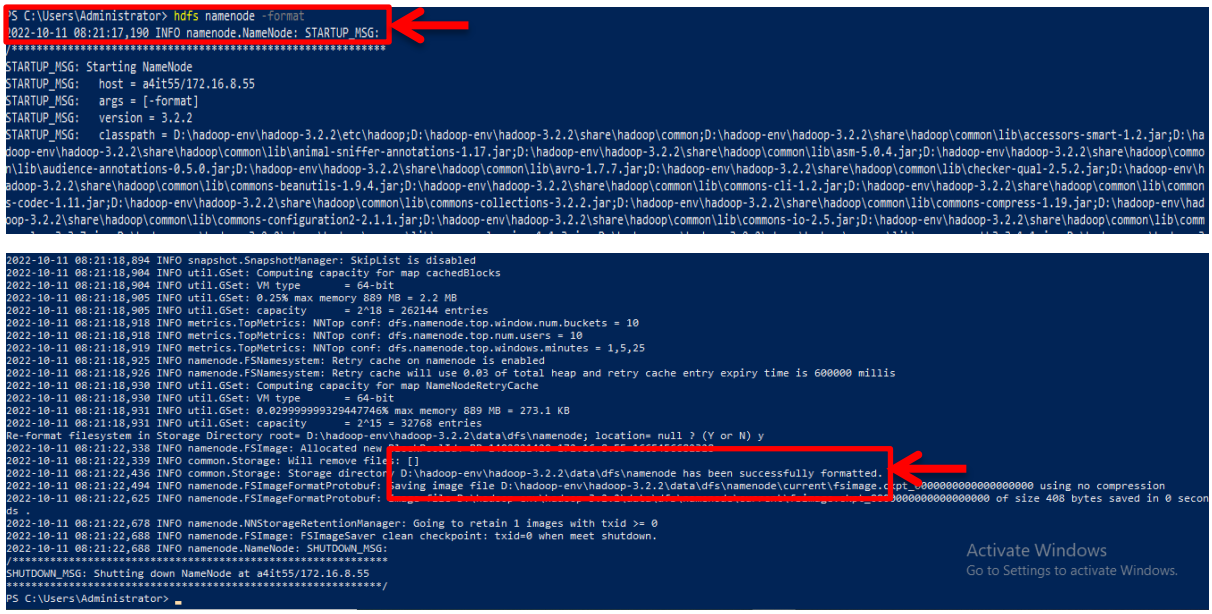
<description>Yarn Node Manager Aux Service</description>

</property>

Step 6: Format the namenode

After finishing the configuration, format the name using the following command

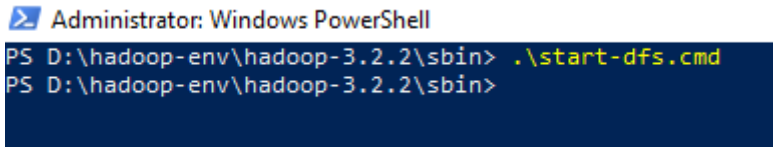
hdfs namenode –format



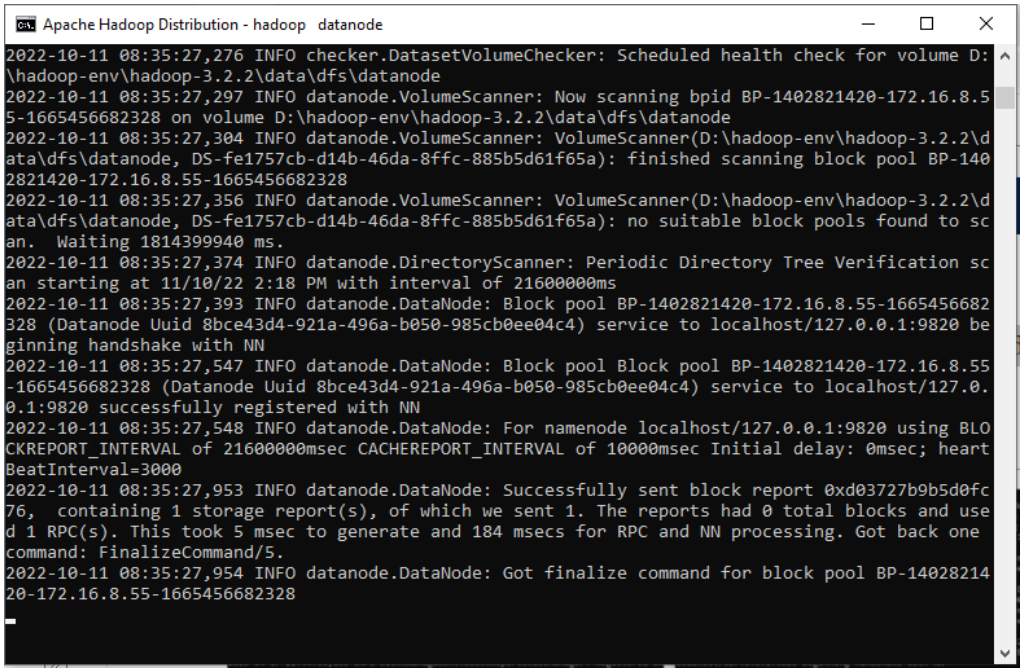
Step 7: Start the Hadoop nodes

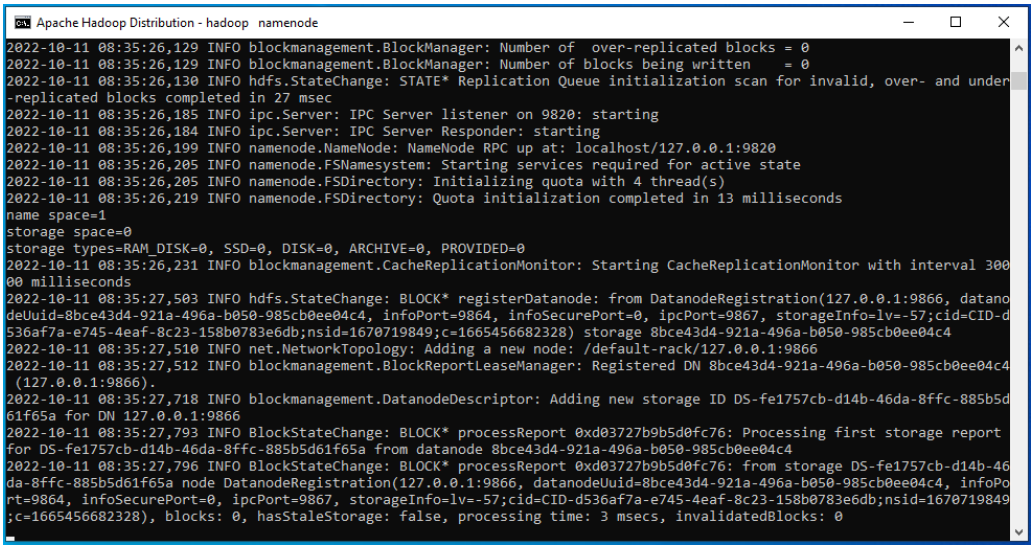
Now navigate to the location "D:\hadoop-env\hadoop-3.2.2\sbin" in powershell and then run the following command to start the Hadoop nodes:

.\start-dfs.cmd



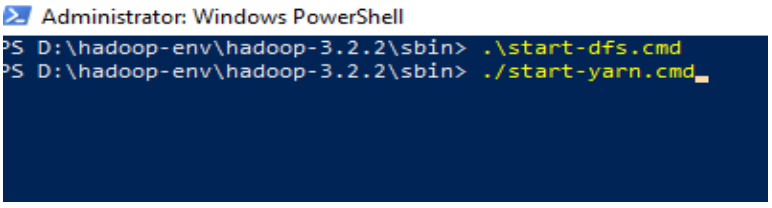
Two command prompt windows will open (one for the **namenode** and one for the **datanode**) as follows:



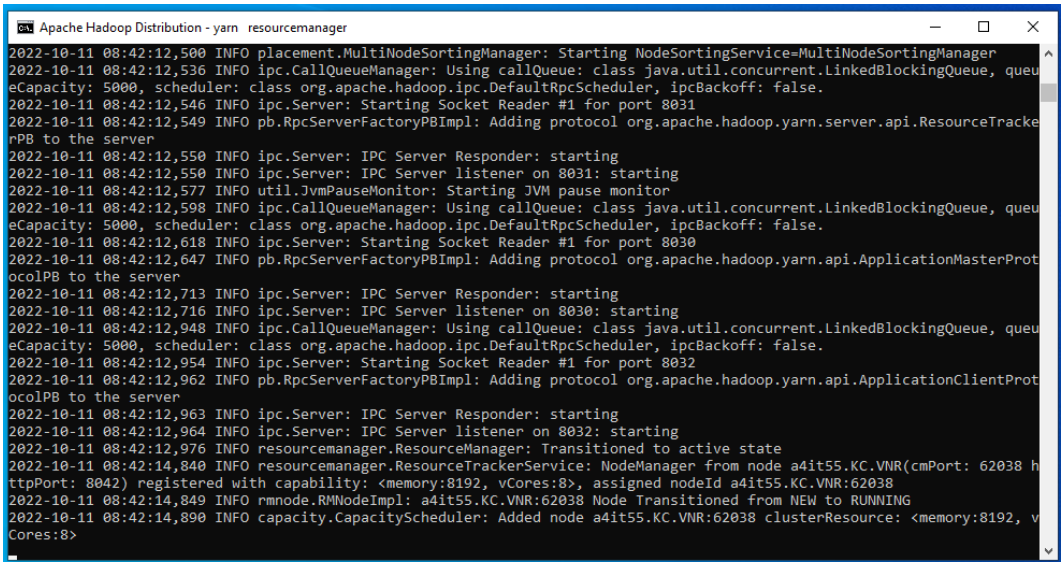


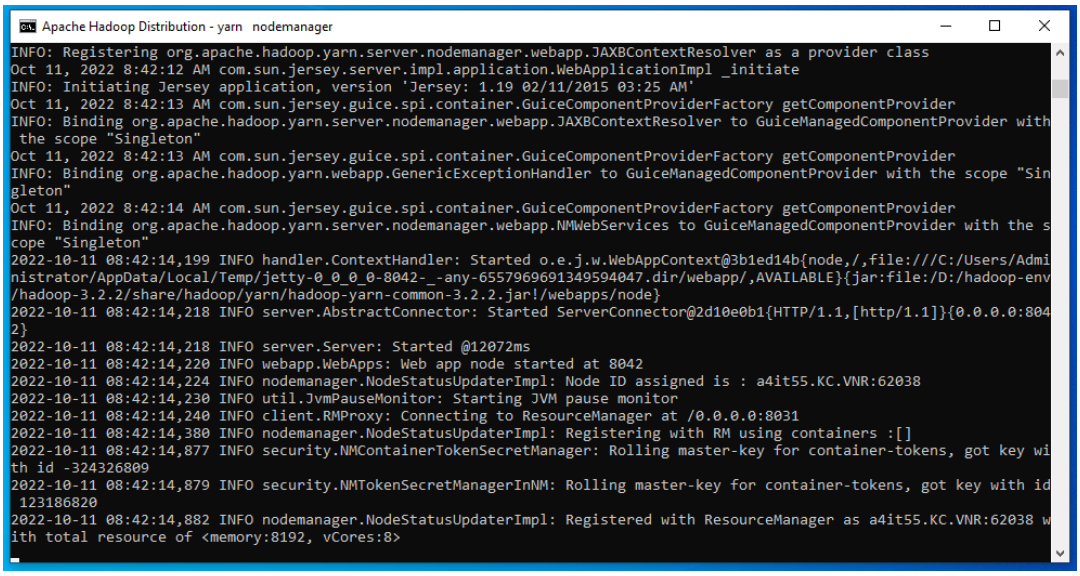
Next, Start the Hadoop Yarn service using the following command:

./start-yarn.cmd



Two command prompt windows will open (one for the **resource manager** and one for the **node manager**) as follows:





To make sure that all services started successfully, Run the following command:

jps

It should display the following services:

14560 DataNode

4960 ResourceManager

5936 NameNode

768 NodeManager

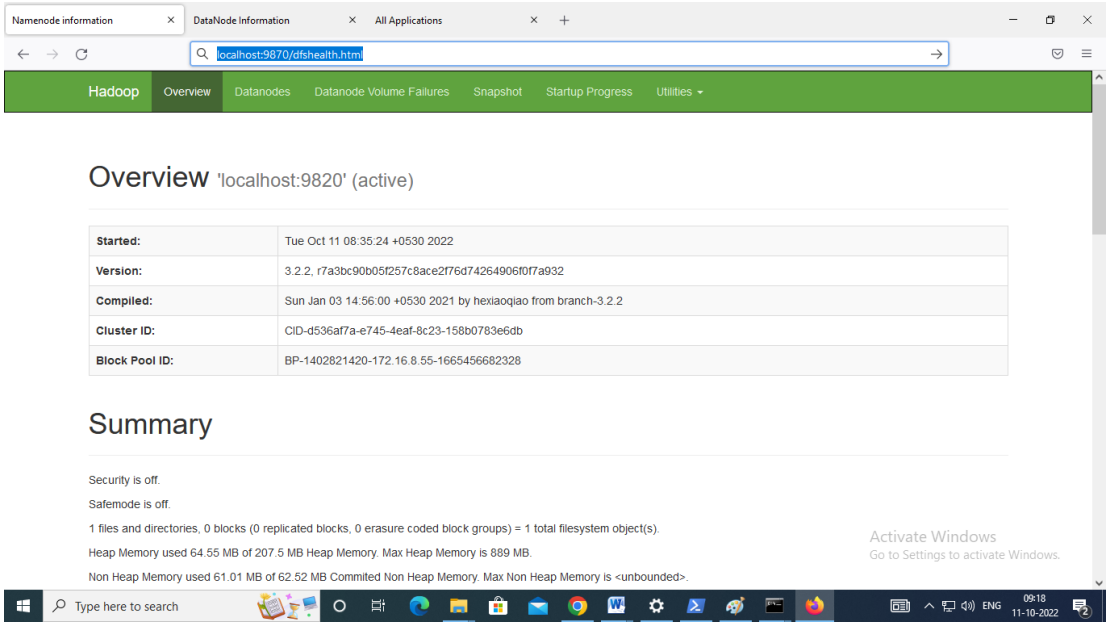
14636 Jps

```
PS D:\hadoop-env\hadoop-3.2.2\sbin> jps
4288 Jps
4896 ResourceManager
4708 NameNode
5852 NodeManager
6860 DataNode
PS D:\hadoop-env\hadoop-3.2.2\sbin>
```

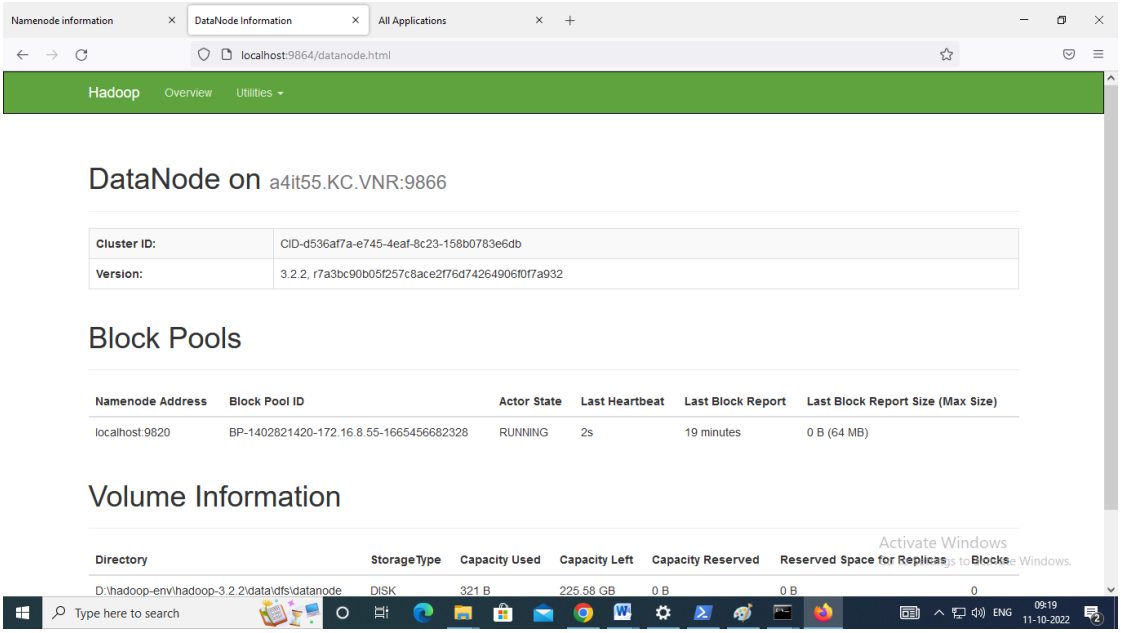
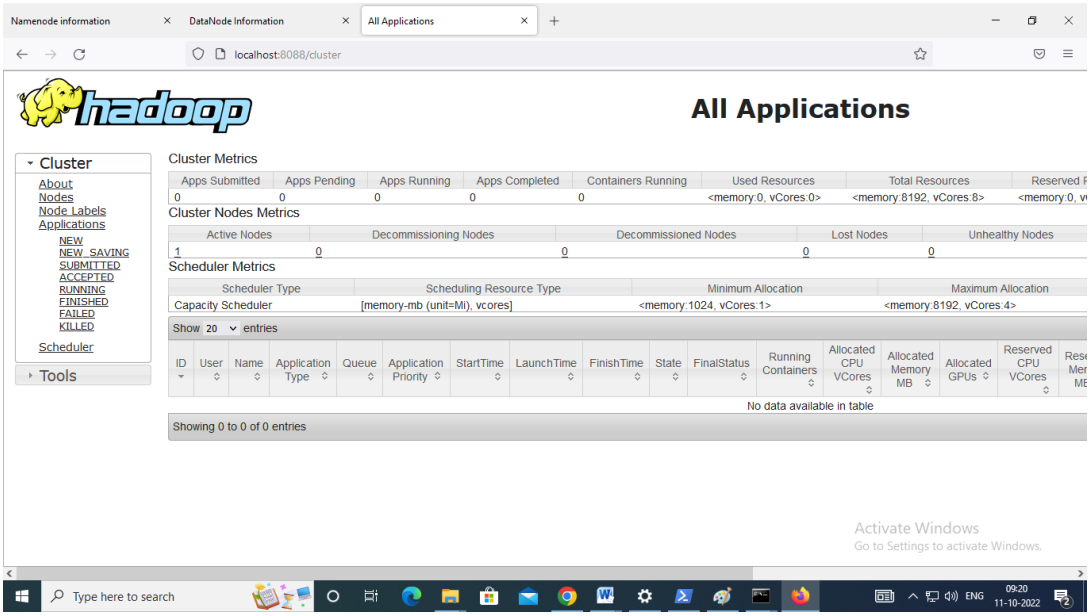
Output

Hadoop Web UI

http://localhost:9870/dfshealth.html



http://localhost:9864/datanode.html



http://localhost:8088/cluster