

LAB- 4

AIM: To setup single node hadoop.

```
lubuntu@lubuntu: ~  
File Actions Edit View Help  
lubuntu@lubuntu: ~  
141 packages can be upgraded. Run 'apt list --upgradable' to see them.  
lubuntu@lubuntu:~$ sudo apt install openjdk-8-jdk -y  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following additional packages will be installed:  
  ca-certificates-java fonts-dejavu-extra java-common libatk-wrapper-java  
  libatk-wrapper-java-jni libice-dev libpthread-stubs0-dev libsm-dev  
  libx11-dev libxau-dev libxcb1-dev libxdmcp-dev libxt-dev  
  openjdk-8-jdk-headless openjdk-8-jre openjdk-8-jre-headless x11proto-dev  
  xorg-sgml-doctools xtrans-dev  
Suggested packages:  
  default-jre libice-doc libsm-doc libx11-doc libxcb-doc libxt-doc  
  openjdk-8-demo openjdk-8-source visualvm fonts-ipafont-gothic  
  fonts-ipafont-mincho fonts-wqy-microhei fonts-wqy-zenhei  
The following NEW packages will be installed:  
  ca-certificates-java fonts-dejavu-extra java-common libatk-wrapper-java  
  libatk-wrapper-java-jni libice-dev libpthread-stubs0-dev libsm-dev  
  libx11-dev libxau-dev libxcb1-dev libxdmcp-dev libxt-dev openjdk-8-jdk  
  openjdk-8-jdk-headless openjdk-8-jre openjdk-8-jre-headless x11proto-dev  
  xorg-sgml-doctools xtrans-dev  
0 upgraded, 20 newly installed, 0 to remove and 141 not upgraded.  
Need to get 47.9 MB of archives.  
hadoop inst... lubuntu lubuntu@lu... 3:36
```

```
lubuntu@lubuntu: ~  
File Actions Edit View Help  
lubuntu@lubuntu: ~  
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/bin/jconsole to  
provide /usr/bin/jconsole (jconsole) in auto mode  
Processing triggers for libc-bin (2.35-0ubuntu3.1) ...  
lubuntu@lubuntu:~$ java -version  
openjdk version "1.8.0_362"  
OpenJDK Runtime Environment (build 1.8.0_362-8u362-ga-0ubuntu1~22.04-b09)  
OpenJDK 64-Bit Server VM (build 25.362-b09, mixed mode)  
lubuntu@lubuntu:~$ sudo apt install openssh-server openssh-client -y  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
openssh-client is already the newest version (1:8.9p1-3ubuntu0.1).  
openssh-client set to manually installed.  
The following additional packages will be installed:  
  ncurses-term openssh-sftp-server ssh-import-id  
Suggested packages:  
  molly-guard monkeysphere  
The following NEW packages will be installed:  
  ncurses-term openssh-server openssh-sftp-server ssh-import-id  
0 upgraded, 4 newly installed, 0 to remove and 141 not upgraded.  
Need to get 750 kB of archives.  
After this operation, 6046 kB of additional disk space will be used.  
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 openssh-sftp-  
hadoop inst... lubuntu lubuntu@lu... 3:37
```

```
lubuntu@lubuntu: ~  
File Actions Edit View Help  
lubuntu@lubuntu: ~  
Setting up ncurses-term (6.3-2) ...  
Processing triggers for man-db (2.10.2-1) ...  
Processing triggers for ufw (0.36.1-4build1) ...  
lubuntu@lubuntu:~$ sudo adduser hdoop  
Adding user `hdoop' ...  
Adding new group `hdoop' (1000) ...  
Adding new user `hdoop' (1000) with group `hdoop' ...  
Creating home directory `/home/hdoop' ...  
Copying files from `/etc/skel' ...  
New password:  
Retype new password:  
Sorry, passwords do not match.  
passwd: Authentication token manipulation error  
passwd: password unchanged  
Try again? [y/N] y  
New password:  
Retype new password:  
passwd: password updated successfully  
Changing the user information for hdoop  
Enter the new value, or press ENTER for the default  
Full Name []:  
Room Number []: 311  
Work Phone []:
```

Password: vitcc

```
lubuntu@lubuntu: ~  
File Actions Edit View Help  
lubuntu@lubuntu: ~  
For more details see su(1).  
lubuntu@lubuntu:~$ hdoop --version  
hdoop: command not found  
lubuntu@lubuntu:~$ ssh-keygen -t rsa -P '' -f ~/.ssh/id_rsa  
Generating public/private rsa key pair.  
Created directory '/home/lubuntu/.ssh'.  
Your identification has been saved in /home/lubuntu/.ssh/id_rsa  
Your public key has been saved in /home/lubuntu/.ssh/id_rsa.pub  
The key fingerprint is:  
SHA256:vLIIT+vGOWVBCFT7fCRY4ltqUSs6kH1/IbMTnxiz7h0Q lubuntu@lubuntu  
The key's randomart image is:  
+---[RSA 3072]---+  
| .oo=. |  
| .o.X .. |  
| *.X+Bo |  
| . BoB+Eo . |  
| oS= *. o |  
| ..=.o . |  
| o.+.o . |  
| . .=. o . |  
| .+.. . |  
+---[SHA256]---+
```

```
lubuntu@lubuntu: ~  
File Actions Edit View Help  
lubuntu@lubuntu: ~  
|-----[SHA256]-----+  
lubuntu@lubuntu:~$ cat ~/.ssh/id_rsa.pub >> ~/.ssh/authorized_keys  
lubuntu@lubuntu:~$ chmod 0600 ~/.ssh/authorized_keys  
lubuntu@lubuntu:~$ ssh localhost  
The authenticity of host 'localhost (127.0.0.1)' can't be established.  
ED25519 key fingerprint is SHA256:LKt3kcesQXmFlI6PRt7s01w0zhKJ0dA6IbMdTly4VAI  
.  
This key is not known by any other names  
Are you sure you want to continue connecting (yes/no/[fingerprint])? y  
Please type 'yes', 'no' or the fingerprint: yes  
Warning: Permanently added 'localhost' (ED25519) to the list of known hosts.  
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-32-generic x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:       https://ubuntu.com/advantage  
  
* Introducing Expanded Security Maintenance for Applications.  
  Receive updates to over 25,000 software packages with your  
  Ubuntu Pro subscription. Free for personal use.  
  
https://ubuntu.com/pro
```

```
lubuntu@lubuntu: ~  
File Actions Edit View Help  
lubuntu@lubuntu: ~  
HTTP request sent, awaiting response... 404 Not Found  
2023-05-02 03:31:35 ERROR 404: Not Found.  
  
lubuntu@lubuntu:~$ wget https://dlcdn.apache.org/hadoop/common/hadoop-3.2.4/h  
adoop-3.2.4.tar.gz  
--2023-05-02 03:32:59-- https://dlcdn.apache.org/hadoop/common/hadoop-3.2.4/  
hadoop-3.2.4.tar.gz  
Resolving dlcdn.apache.org (dlcdn.apache.org)... 151.101.2.132, 2a04:4e42::64  
4  
Connecting to dlcdn.apache.org (dlcdn.apache.org)|151.101.2.132|:443... conne  
cted.  
HTTP request sent, awaiting response... 200 OK  
Length: 492368219 (470M) [application/x-gzip]  
Saving to: 'hadoop-3.2.4.tar.gz'  
  
hadoop-3.2.4.tar.gz 100%[=====>] 469.56M 22.0MB/s in 26s  
2023-05-02 03:33:26 (17.7 MB/s) - 'hadoop-3.2.4.tar.gz' saved [492368219/4923  
68219]  
  
lubuntu@lubuntu:~$ tar xzf hadoop-3.2.4.tar.gz  
lubuntu@lubuntu:~$  
lubuntu@lubuntu:~$
```

#Edit the .bashrc shell configuration file using a text editor of your choice

```
$ sudo nano .bashrc
```

#Copy the following Hadoop Related Options

```
export HADOOP_HOME=/home/hdoop/hadoop-3.2.1
```

```
export HADOOP_INSTALL=$HADOOP_HOME
```

```
export HADOOP_MAPRED_HOME=$HADOOP_HOME
```

```
export HADOOP_COMMON_HOME=$HADOOP_HOME
```

```
export HADOOP_HDFS_HOME=$HADOOP_HOME
```

```
export YARN_HOME=$HADOOP_HOME
```

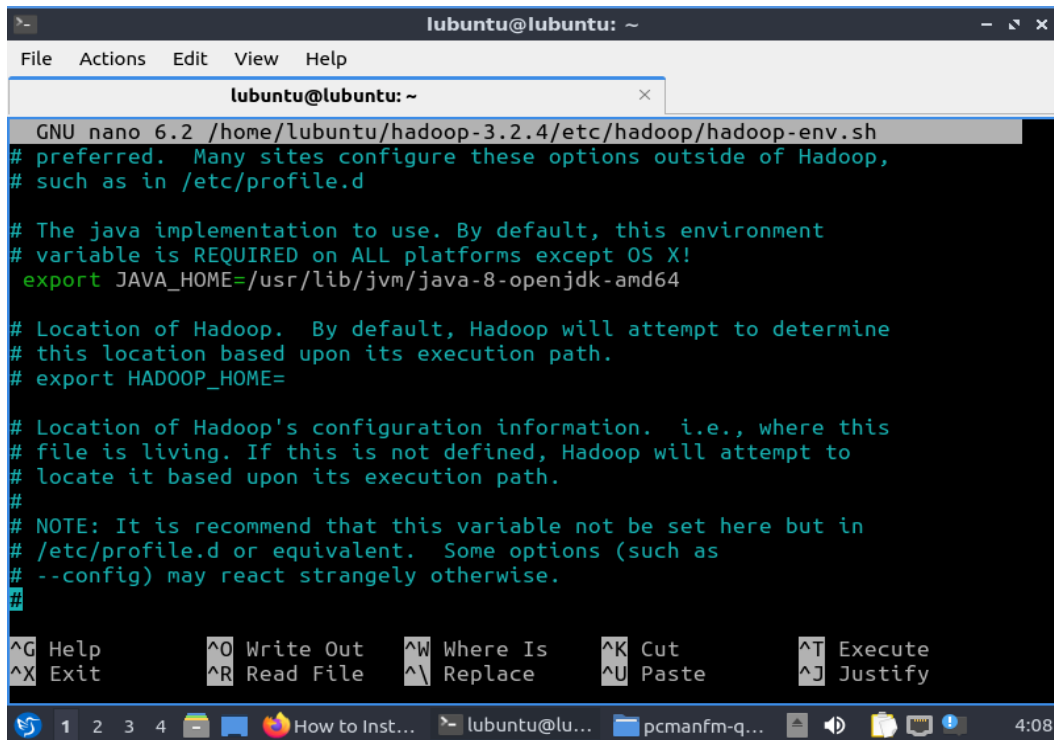
```
export HADOOP_COMMON_LIB_NATIVE_DIR=$HADOOP_HOME/lib/native
```

```
export PATH=$PATH:$HADOOP_HOME/sbin:$HADOOP_HOME/bin
```

```
export HADOOP_OPTS="-Djava.library.path=$HADOOP_HOME/lib/nativ"
```

#Apply the changes to the current running environment

```
$ source ~/.bashrc
```



```
lubuntu@lubuntu: ~
File Actions Edit View Help
lubuntu@lubuntu: ~
GNU nano 6.2 /home/lubuntu/hadoop-3.2.4/etc/hadoop/hadoop-env.sh
# preferred.  Many sites configure these options outside of Hadoop,
# such as in /etc/profile.d

# The java implementation to use.  By default, this environment
# variable is REQUIRED on ALL platforms except OS X!
export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64

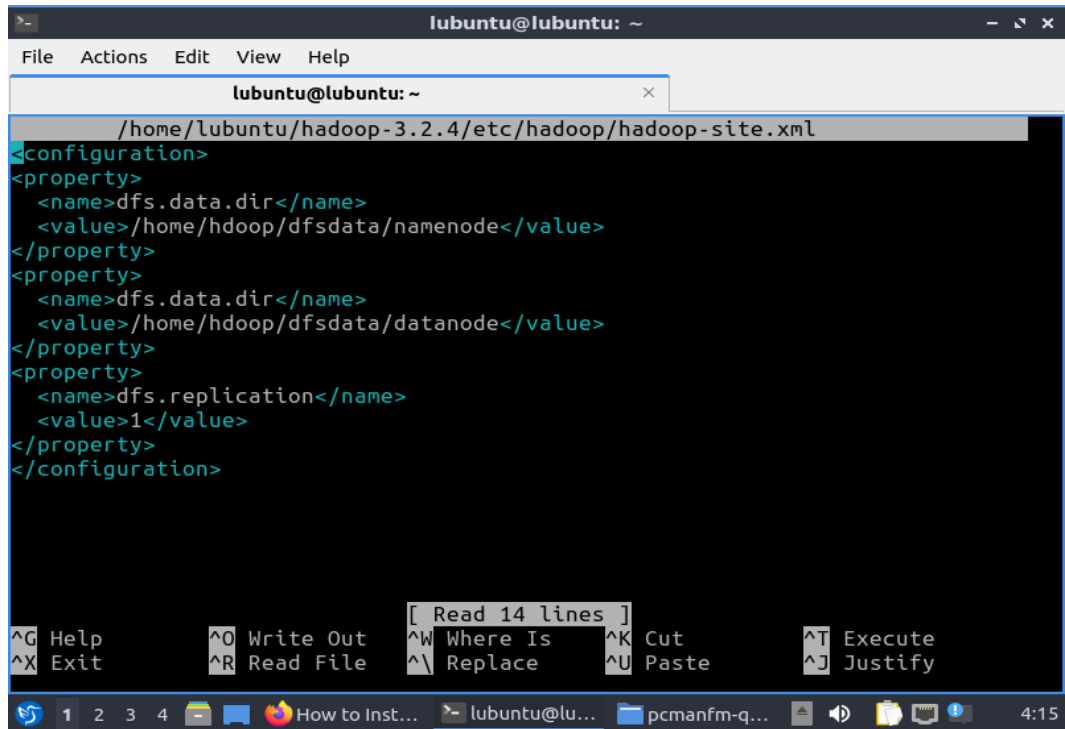
# Location of Hadoop.  By default, Hadoop will attempt to determine
# this location based upon its execution path.
# export HADOOP_HOME=

# Location of Hadoop's configuration information.  i.e., where this
# file is living.  If this is not defined, Hadoop will attempt to
# locate it based upon its execution path.
#
# NOTE: It is recommend that this variable not be set here but in
# /etc/profile.d or equivalent.  Some options (such as
# --config) may react strangely otherwise.
#
```

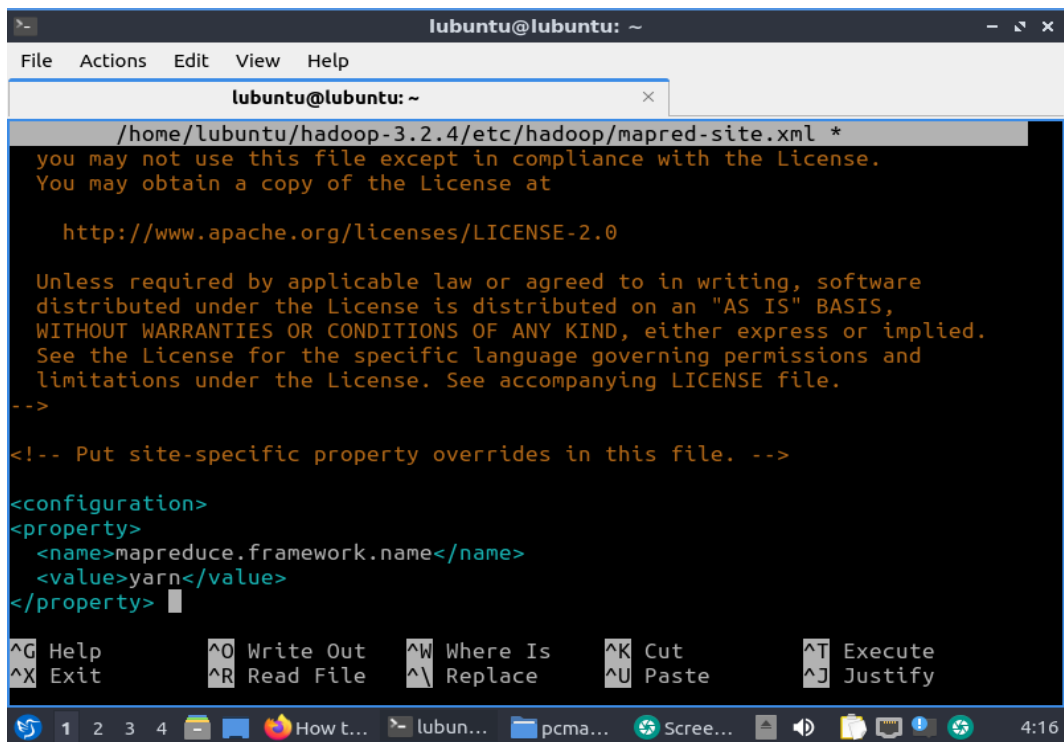
```
lubuntu@lubuntu:~$ which javac
/usr/bin/javac
```

```
lubuntu@lubuntu: ~  
File Actions Edit View Help  
lubuntu@lubuntu: ~  
-bash: export: `HADOOP_OPTS-Djava.library.path=/home/hdoop/hadoop-3.2.4/lib/n  
ativ': not a valid identifier  
lubuntu@lubuntu:~$ sudo nano .bashrc  
lubuntu@lubuntu:~$ source ~/.bashrc  
-bash: export: `HADOOP_OPTS-Djava.library.path=/home/hdoop/hadoop-3.2.4/lib/n  
ativ': not a valid identifier  
lubuntu@lubuntu:~$ sudo nano .bashrc  
lubuntu@lubuntu:~$ source ~/.bashrc  
lubuntu@lubuntu:~$ sudo nano $HADOOP_HOME/etc/hadoop/hadoop-env.sh  
lubuntu@lubuntu:~$ sudo nano $HADOOP_HOME/etc/hadoop/hadoop-env.sh  
lubuntu@lubuntu:~$ sudo nano /home/lubuntu/hadoop-3.2.4/etc/hadoop  
lubuntu@lubuntu:~$ sudo nano /home/lubuntu/hadoop-3.2.4/etc/hadoop/hadoop-env  
.sh  
lubuntu@lubuntu:~$ sudo nano /home/lubuntu/hadoop-3.2.4/etc/hadoop/hadoop-env  
.sh  
lubuntu@lubuntu:~$ which javac  
/usr/bin/javac  
lubuntu@lubuntu:~$ readlink -f /usr/bin/javac  
/usr/lib/jvm/java-8-openjdk-amd64/bin/javac  
lubuntu@lubuntu:~$ sudo nano /home/lubuntu/hadoop-3.2.4/etc/hadoop/core-site.  
xml
```

```
lubuntu@lubuntu: ~  
File Actions Edit View Help  
lubuntu@lubuntu: ~  
GNU nano 6.2 /home/lubuntu/hadoop-3.2.4/etc/hadoop/core-site.xml *  
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.  
See the License for the specific language governing permissions and  
limitations under the License. See accompanying LICENSE file.  
-->  
<!-- Put site-specific property overrides in this file. -->  
  
<configuration>  
<property>  
  <name>hadoop.tmp.dir</name>  
  <value>/home/hdoop/tmpdata</value>  
</property>  
<property>  
  <name>fs.default.name</name>  
  <value>hdfs://127.0.0.1:9000</value>  
</property>  
</configuration>  
  
File Name to Write: /home/lubuntu/hadoop-3.2.4/etc/hadoop/core-site.xml  
^G Help      M-D DOS Format  M-A Append     M-B Backup File  
^C Cancel    M-M Mac Format  M-P Prepend    ^T Browse
```



```
lubuntu@lubuntu: ~  
File Actions Edit View Help  
lubuntu@lubuntu: ~  
/home/lubuntu/hadoop-3.2.4/etc/hadoop/hadoop-site.xml  
<configuration>  
<property>  
  <name>dfs.data.dir</name>  
  <value>/home/hadoop/dfsdata/namenode</value>  
</property>  
<property>  
  <name>dfs.data.dir</name>  
  <value>/home/hadoop/dfsdata/datanode</value>  
</property>  
<property>  
  <name>dfs.replication</name>  
  <value>1</value>  
</property>  
</configuration>  
[ Read 14 lines ]  
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute  
^X Exit      ^R Read File  ^_ Replace    ^U Paste      ^J Justify  
1 2 3 4 How to Inst... lubuntu@lu... pcmanfm-q... 4:15
```



```
lubuntu@lubuntu: ~  
File Actions Edit View Help  
lubuntu@lubuntu: ~  
/home/lubuntu/hadoop-3.2.4/etc/hadoop/mapred-site.xml *  
you may not use this file except in compliance with the License.  
You may obtain a copy of the License at  
  
http://www.apache.org/licenses/LICENSE-2.0  
  
Unless required by applicable law or agreed to in writing, software  
distributed under the License is distributed on an "AS IS" BASIS,  
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.  
See the License for the specific language governing permissions and  
limitations under the License. See accompanying LICENSE file.  
-->  
  
<!-- Put site-specific property overrides in this file. -->  
  
<configuration>  
<property>  
  <name>mapreduce.framework.name</name>  
  <value>yarn</value>  
</property>  
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute  
^X Exit      ^R Read File  ^_ Replace    ^U Paste      ^J Justify  
1 2 3 4 How t... lubun... pcma... Scree... 4:16
```

To setup multinode hadoop cluster, following steps are followed:

- 1) Hardware and Network Setup
- 2) Operating System Setup
- 3) Java Installation
- 4) Hadoop installation
- 5) Configure SSH
- 6) Configure Hadoop Cluster
- 7) Start Hadoop Services
- 8) Verify Hadoop cluster