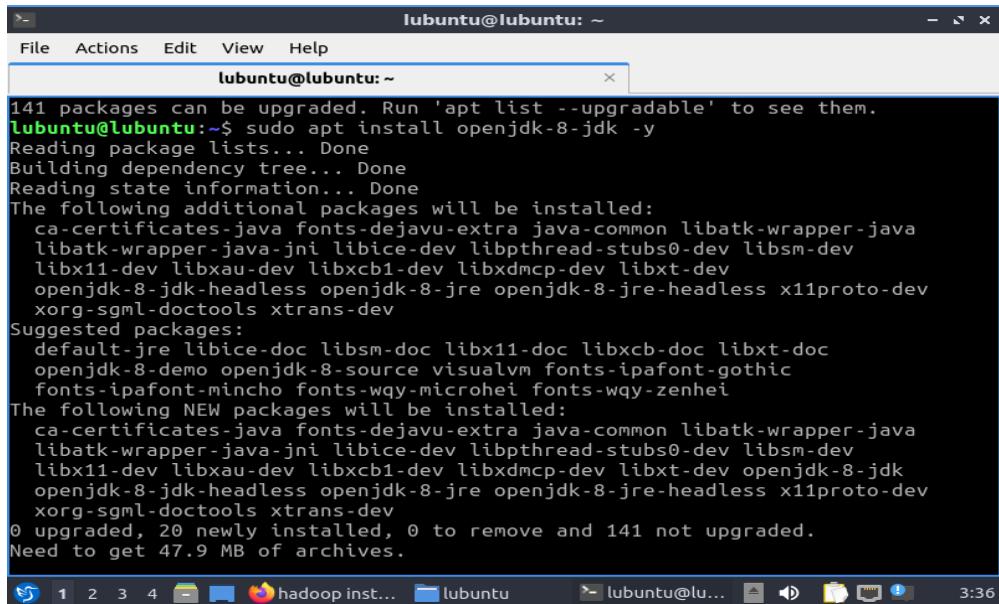
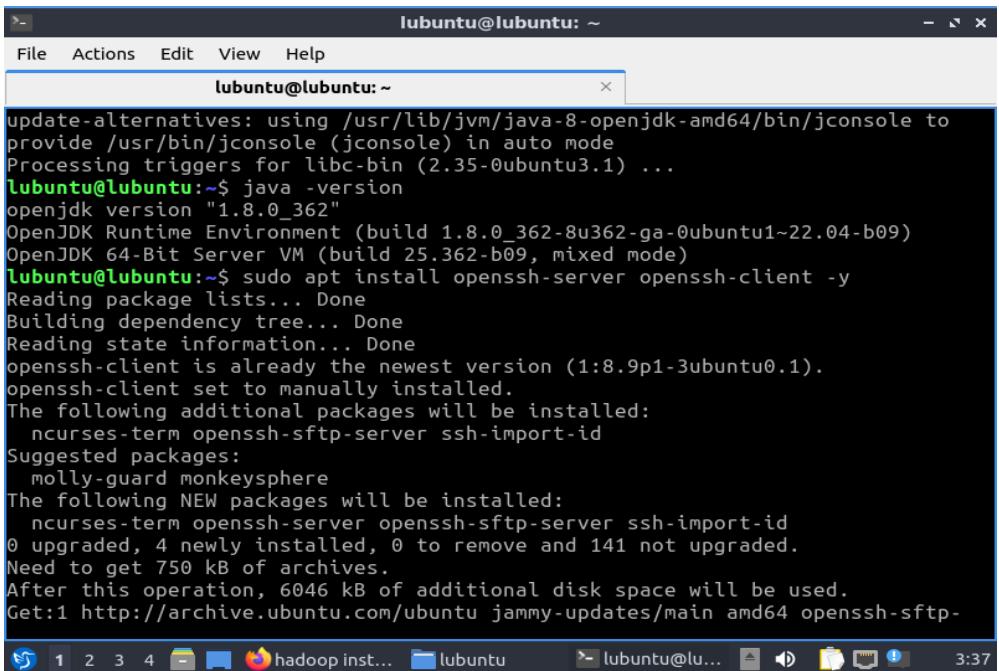


LAB- 4

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 libxcb1-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.
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-
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 []:

lubuntu@lubuntu: ~
File Actions Edit View Help
lubuntu@lubuntu: ~
```

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:vLIT+vGOVBCFT7fCRY4ltqUSs6kH1/IbMTnxiz7h0Q lubuntu@lubuntu
The key's randomart image is:
+---[RSA 3072]---+
|       oo=.
|       .oX ..
|       *.X+Bo
|       . BoB+Eo .
|       oS= *.
|       ..=.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: ~
```

```
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/hadoop-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... connected.
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 [492368219/492368219]

lubuntu@lubuntu:~$ tar xzf hadoop-3.2.4.tar.gz
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.
#


^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...  4:08
```

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

```
-bash: export: `HADOOP_OPTS-Djava.library.path=/home/hadoop/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/hadoop/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:~$
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: ~
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/hadoop/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    ^I 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
4:15
```

```
lubuntu@lubuntu: ~
File Actions Edit View Help
lubuntu@lubuntu: ~
/home/lubuntu/hadoop-3.2.4/etc/hadoop/mapred-site.xml *
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http://www.apache.org/licenses/LICENSE-2.0

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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. --&gt;

&lt;configuration&gt;
&lt;property&gt;
  &lt;name&gt;mapreduce.framework.name&lt;/name&gt;
  &lt;value&gt;yarn&lt;/value&gt;
&lt;/property&gt;
^G Help      ^O Write Out    ^W Where Is    ^K Cut        ^T Execute
^X Exit      ^R Read File    ^\ Replace     ^U Paste      ^J Justify
4:16</pre>
```

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