

DIGITAL ASSIGNMENT 5

NAME:-

SHIVAM UPADHYAY

REG. NO.:-

20BDS0318

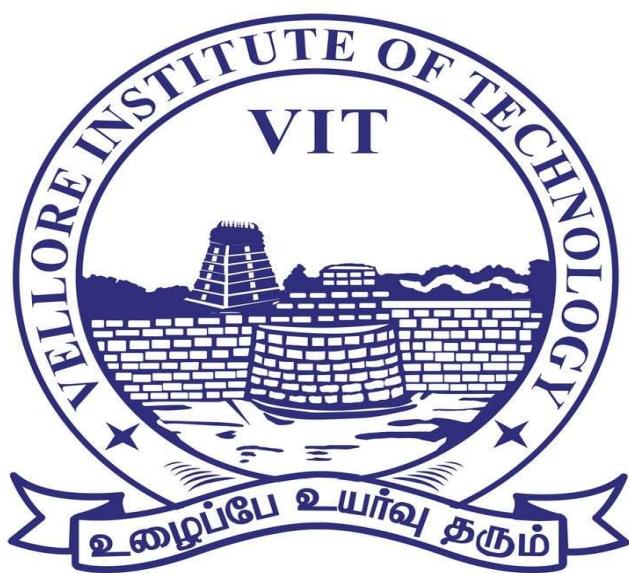
**SUBJECT: - PRINCIPLES OF CLOUD
COMPUTING**

COURSE CODE:- CSE3035

SLOT:-

L13+L14

**SUBMITTED TO:- PROF. LATHA
REDDY N.**



PROBLEM-1

Configure a VLAN using cisco packet tracer and analyze traffic issues

Write down the aim, procedure (with necessary screenshots) and result.

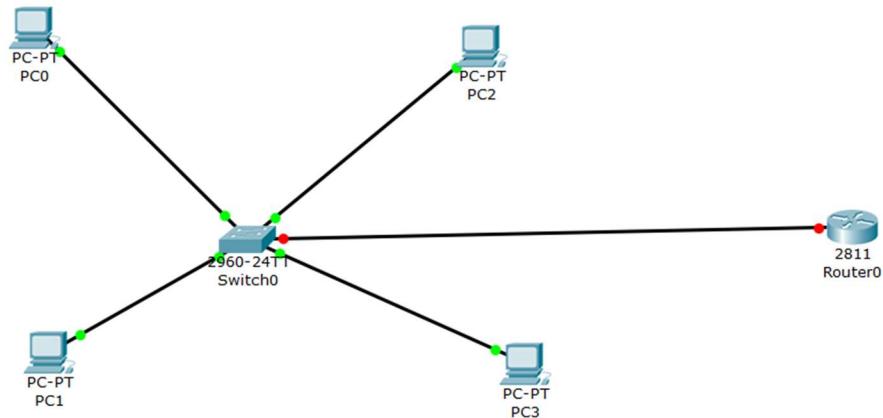
AIM:-

Configure a VLAN using cisco packet tracer and analyze traffic issues

PROCEDURE:-

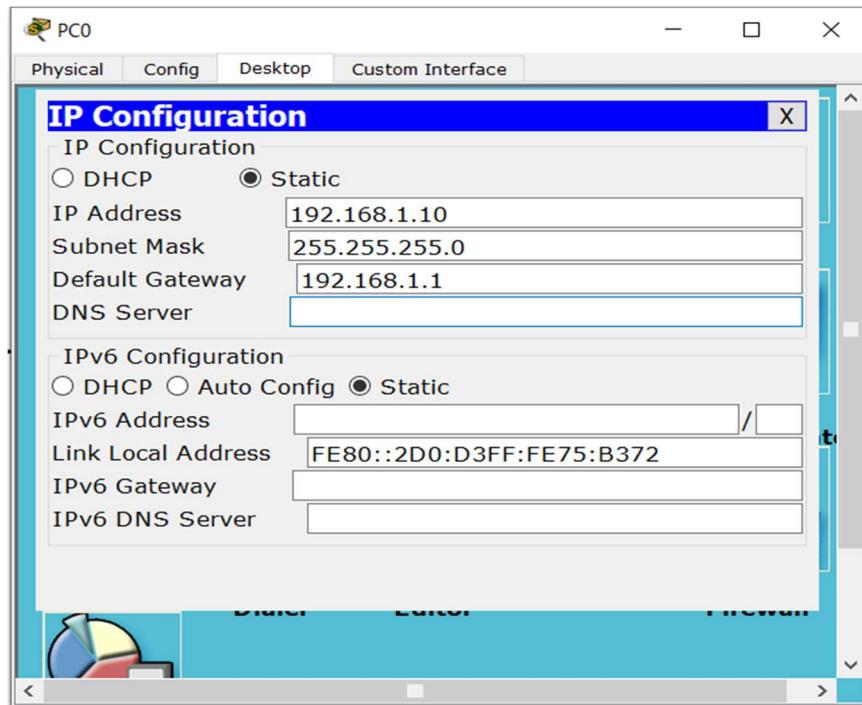
1. (i) Create your network topology using Cisco packet tracer

First place the 4 computer and a switch in between to connect these thing and a router to connect with switch and connect all these with connecting wire.

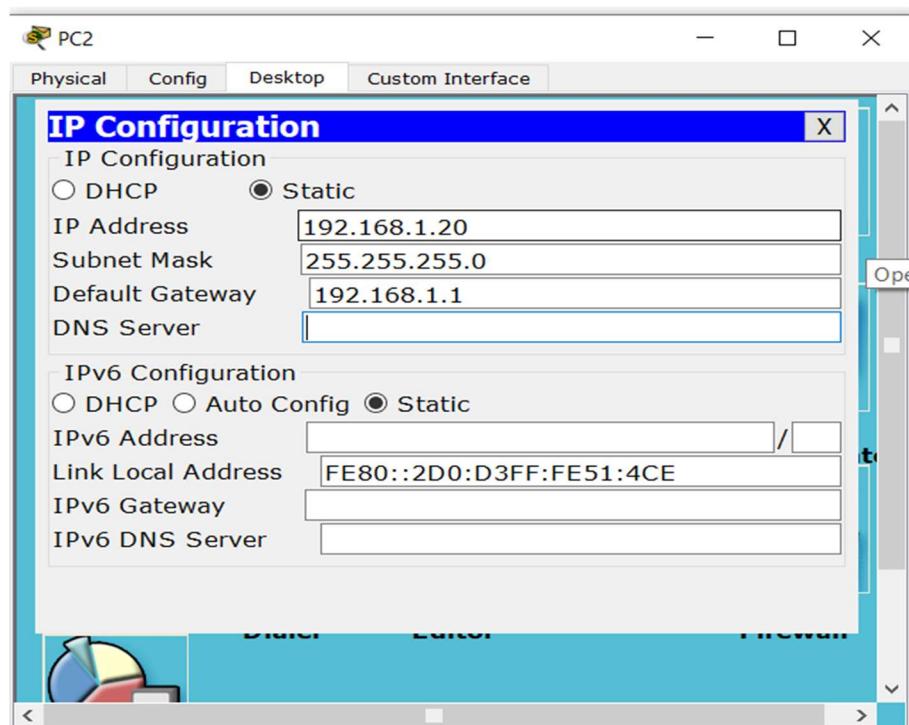


- (ii) Now give ip address and default gateway to all the 4 computer as

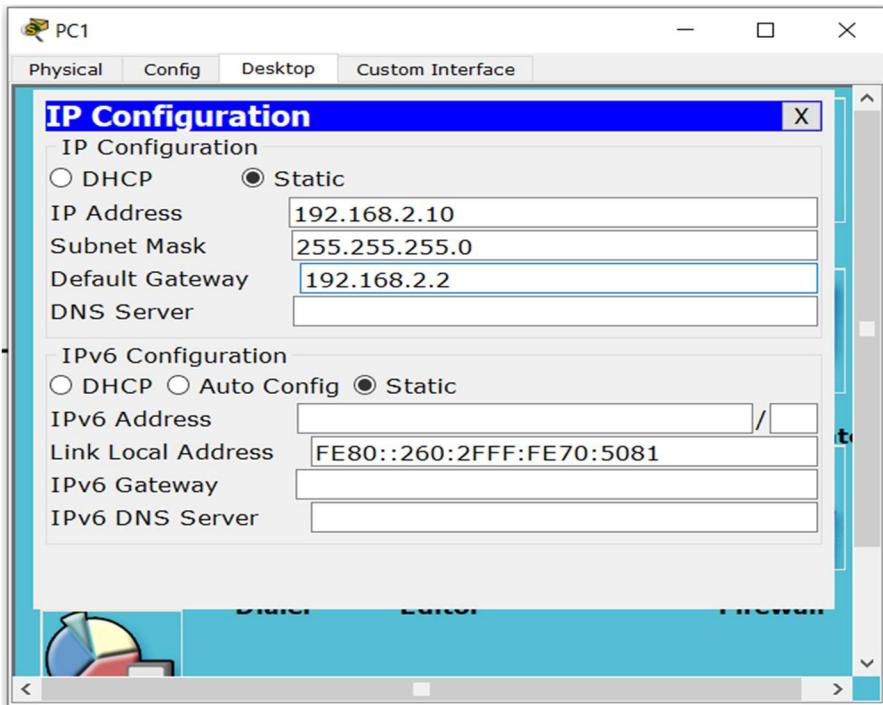
For pc 1



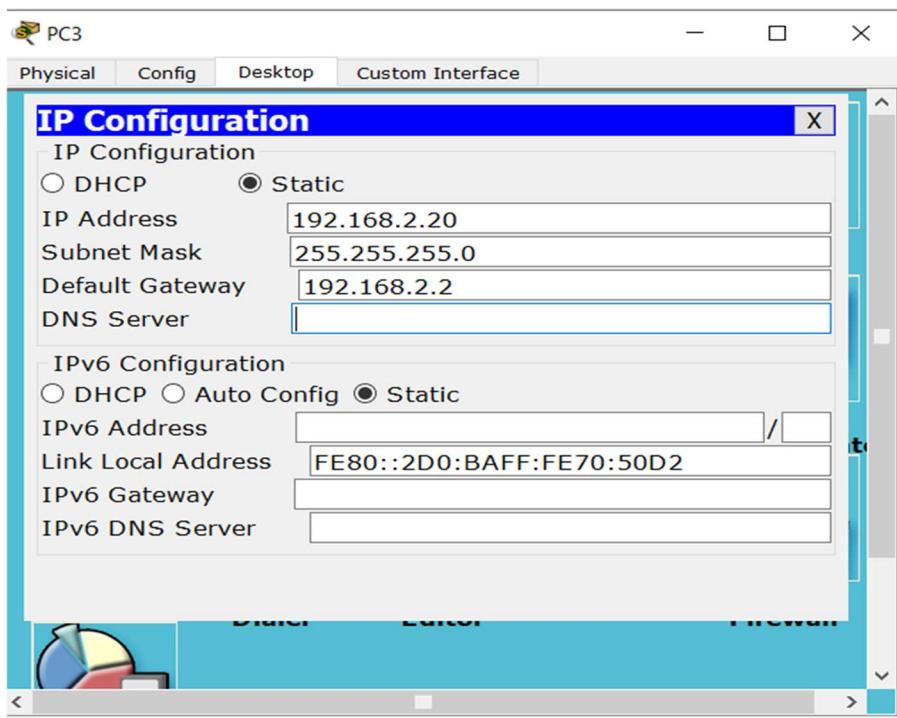
For pc2



Pc3



For pc4



(iii) after setting these pc now come to switches in CLI section and give some command

```
Switch#en
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name HR
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name IT
Switch(config-vlan)#int fa0/1
Switch(config-if)#switchport access mode
^
% Invalid input detected at '^' marker.

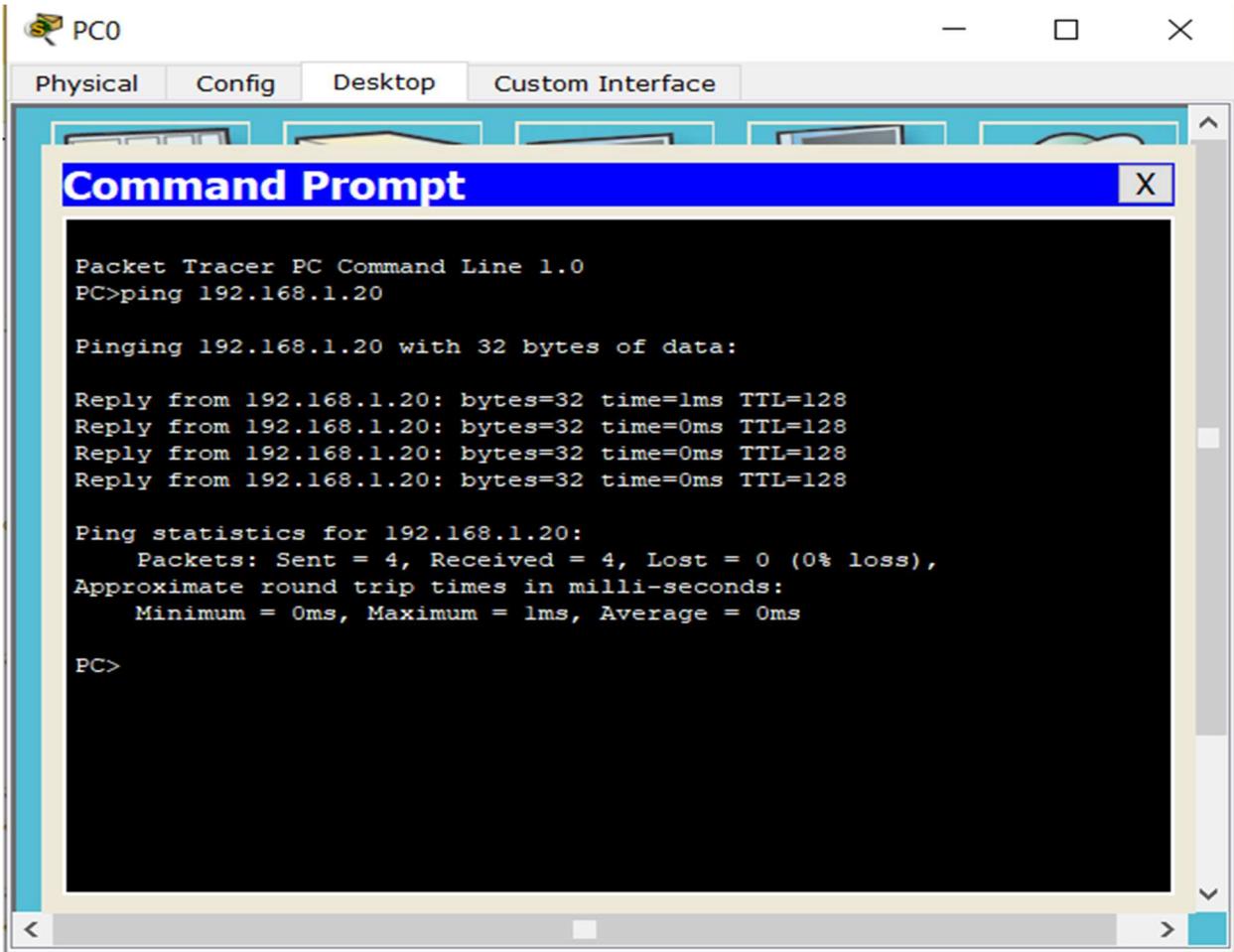
Switch(config-if)#switchport mode access
^
% Invalid input detected at '^' marker.

Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#int fa0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
^
% Invalid input detected at '^' marker.

Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int fa0/5
Switch(config-if)#switchport mode trunk
Switch(config-if)#

```

(iv) Open the command prompt in any one of the 4 pc and give ping command



Now configure router with the following command

```
Continue with configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>en
Router#config terminal
^
% Invalid input detected at '^' marker.

Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#int fa0/0.10
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.10, changed state to up

Router(config-subif)#encapsulation dot1q 10
^
% Invalid input detected at '^' marker.

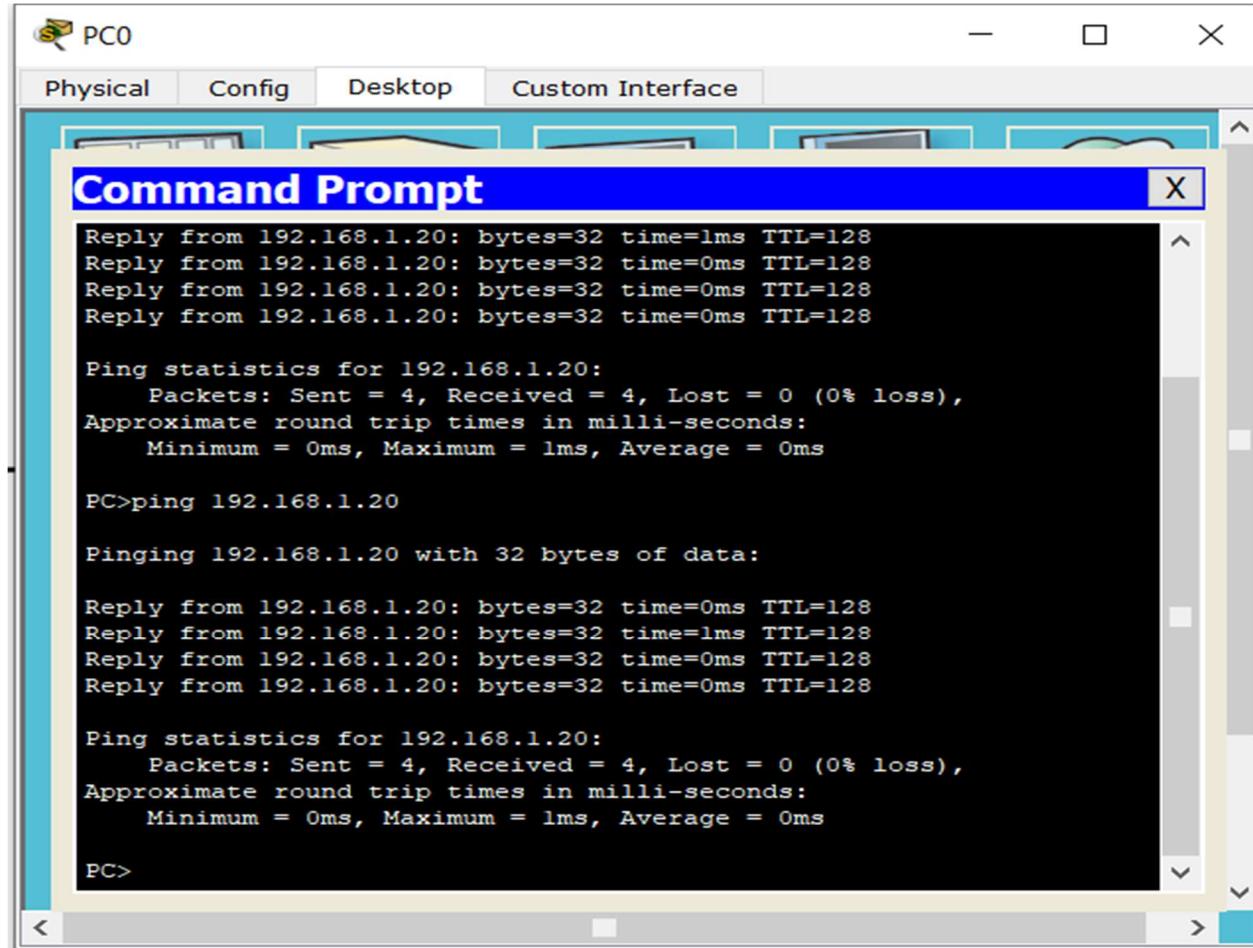
Router(config-subif)#encapsulation dot1q 10
Router(config-subif)#ip add 192.168.1.1 255.255.255.0
Router(config-subif)#int fa0/0.20
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.20, changed state to up

Router(config-subif)#encapsulation dot1q 20
Router(config-subif)#ip add 192.168.2.2 255.255.255.0
```

now give the same ping command to same pc

1.



The screenshot shows a window titled "Command Prompt" within a network simulation interface. The window displays the output of a ping command sent from the local machine to another host at 192.168.1.20. The output shows four successful replies with zero loss and minimal latency (0ms to 1ms). The interface includes tabs for Physical, Config, Desktop, and Custom Interface, and a toolbar with icons for file operations.

```
Reply from 192.168.1.20: bytes=32 time=lms TTL=128
Reply from 192.168.1.20: bytes=32 time=0ms TTL=128
Reply from 192.168.1.20: bytes=32 time=0ms TTL=128
Reply from 192.168.1.20: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.1.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>ping 192.168.1.20

Pinging 192.168.1.20 with 32 bytes of data:

Reply from 192.168.1.20: bytes=32 time=0ms TTL=128
Reply from 192.168.1.20: bytes=32 time=lms TTL=128
Reply from 192.168.1.20: bytes=32 time=0ms TTL=128
Reply from 192.168.1.20: bytes=32 time=0ms TTL=128

Ping statistics for 192.168.1.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>
```

RESULT:-

We have successfully transferred the packet without any loss and there is no traffic.

PROBLEM-2

Install the Hadoop framework and create an application using Map Reduce Programming Model

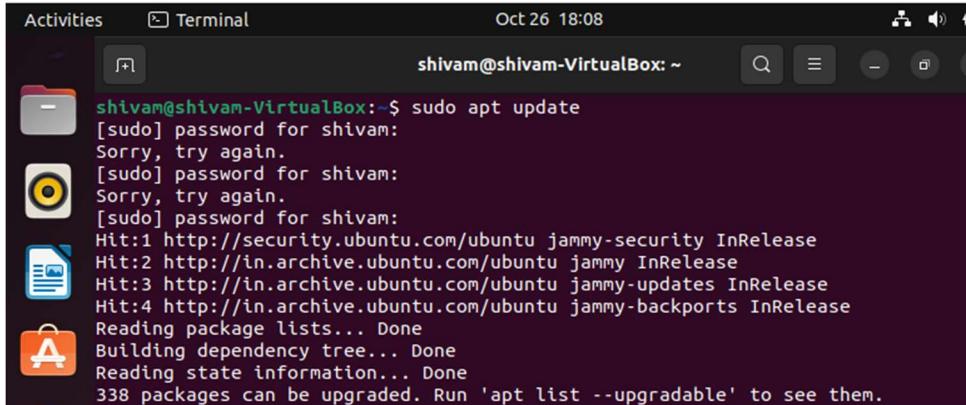
Write down the aim, procedure (with necessary screenshots) and result.

AIM:-

Installation of Hadoop framework and creating an application using Map Reduce Programming Model

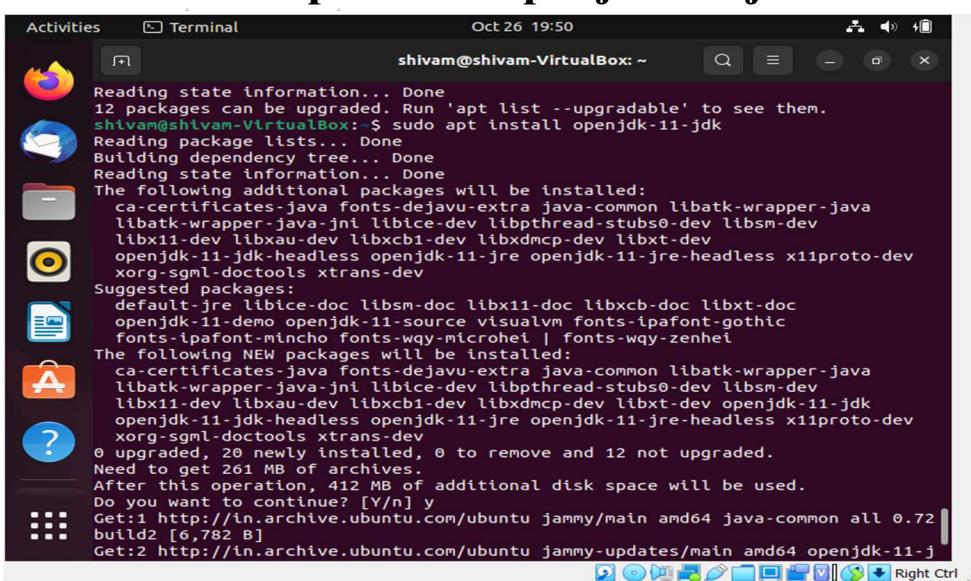
PROCEDURE :-

- Update the system repositories - sudo apt update

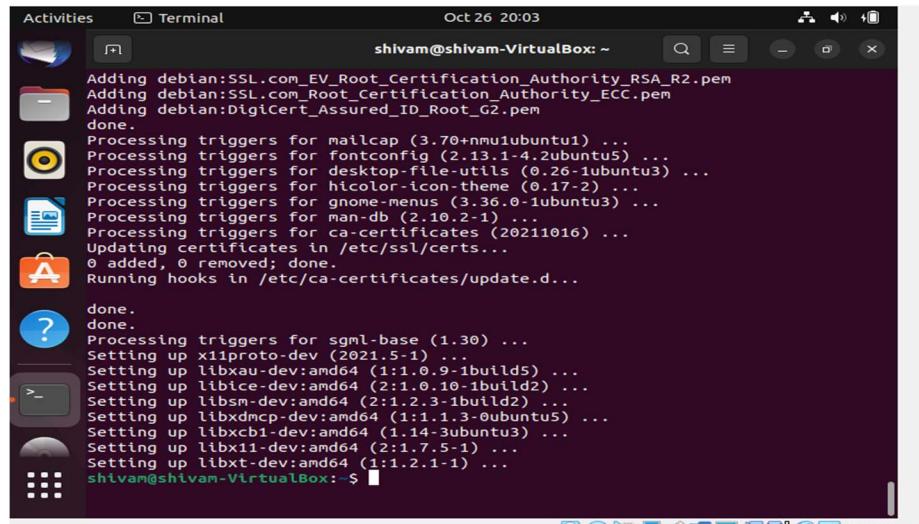


```
Activities Terminal Oct 26 18:08
shivam@shivam-VirtualBox:~$ sudo apt update
[sudo] password for shivam:
Sorry, try again.
[sudo] password for shivam:
Sorry, try again.
[sudo] password for shivam:
Hit:1 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
338 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

- Install Java - sudo apt install openjdk-11-jdk



```
Activities Terminal Oct 26 19:50
shivam@shivam-VirtualBox:~$ sudo apt install openjdk-11-jdk
Reading state information... Done
12 packages can be upgraded. Run 'apt list --upgradable' to see them.
shivam@shivam-VirtualBox:~$ sudo apt install openjdk-11-jdk
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-11-jdk-headless openjdk-11-jre openjdk-11-jre-headless x11proto-dev
  xorg-sgml-doctools xtrans-dev
Suggested packages:
  default-jre libICE-doc libSM-doc libX11-doc libxcb-doc libxt-doc
  openjdk-11-demo openjdk-11-source visualvm fonts-ipafont-gothic
  fonts-ipafont-mnchko fonts-way-microhei | fonts-way-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-11-jdk
  openjdk-11-jdk-headless openjdk-11-jre openjdk-11-jre-headless x11proto-dev
  xorg-sgml-doctools xtrans-dev
0 upgraded, 0 newly installed, 0 to remove and 12 not upgraded.
Need to get 261 MB of archives.
After this operation, 412 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 java-common all 0.72
build2 [6,782 B]
Get:2 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 openjdk-11-j
```

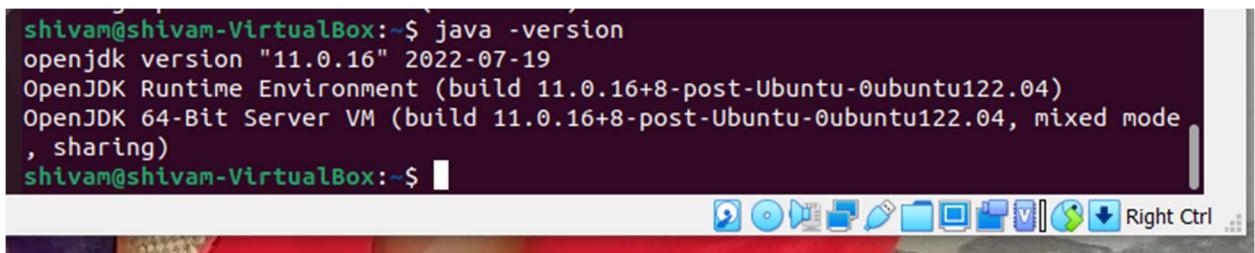


```

Activities Terminal Oct 26 20:03
shivam@shivam-VirtualBox: ~
Adding debian:SSL.com_EV_Root_Certification_Authority_RSA_R2.pem
Adding debian:SSL.com_Root_Certification_Authority_ECC.pem
Adding debian:DigiCert_Assured_ID_Root_G2.pem
done.
Processing triggers for mailcap (3.70+nmuiubuntu1) ...
Processing triggers for fontconfig (2.13.1-4.2ubuntu5) ...
Processing triggers for desktop-file-utils (0.26-1ubuntu3) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu3) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for ca-certificates (20211016) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...

done.
done.
Processing triggers for sgml-base (1.30) ...
Setting up x11proto-dev (2021.5-1) ...
Setting up libxau-dev:amd64 (1:1.0.9-1build5) ...
Setting up libice-dev:amd64 (2:1.0.10-1build2) ...
Setting up libsm-dev:amd64 (2:1.2.3-1build2) ...
Setting up libxdmcp-dev:amd64 (1:1.1.3-0ubuntu5) ...
Setting up libxcb1-dev:amd64 (1.14-3ubuntu3) ...
Setting up libxi-dev:amd64 (2:1.7.5-1) ...
Setting up libxt-dev:amd64 (1:1.2.1-1) ...
shivam@shivam-VirtualBox: ~$
```

- Verify the existence of the installed Java by checking its version - `java -version`

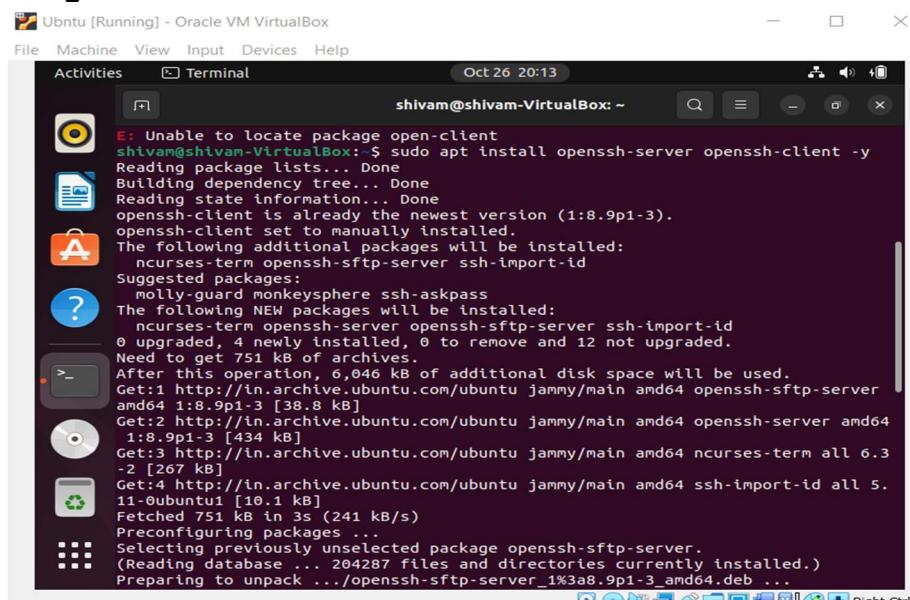


```

shivam@shivam-VirtualBox: ~$ java -version
openjdk version "11.0.16" 2022-07-19
OpenJDK Runtime Environment (build 11.0.16+8-post-Ubuntu-0ubuntu122.04)
OpenJDK 64-Bit Server VM (build 11.0.16+8-post-Ubuntu-0ubuntu122.04, mixed mode
, sharing)
shivam@shivam-VirtualBox: ~$
```

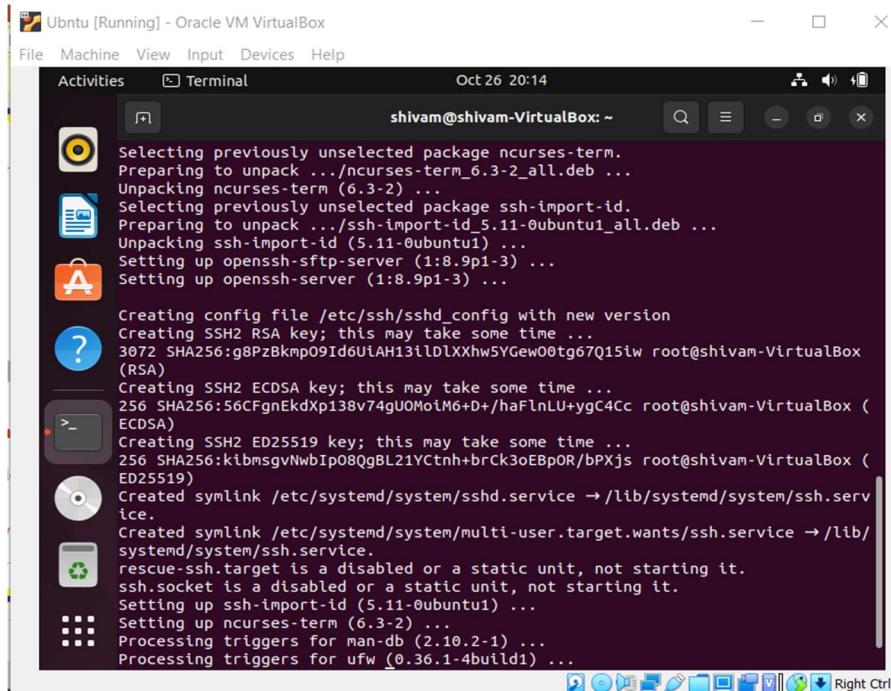
- Now open ssh server

By running `sudo apt install openssh-server openssh-client -y`



```

Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Oct 26 20:13
E: Unable to locate package open-client
shivam@shivam-VirtualBox: ~$ 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 (1:8.9p1-3).
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 monkeyphere ssh-askpass
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 12 not upgraded.
Need to get 751 kB of archives.
After this operation, 0,046 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 openssh-sftp-server
am64 1:8.9p1-3 [38.8 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 openssh-server amd64
1:8.9p1-3 [434 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 ncurses-term all 6.3
-2 [267 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 ssh-import-id all 5.
11-0ubuntu1 [10.1 kB]
Fetched 751 kB in 3s (241 kB/s)
Preconfiguring packages ...
Selecting previously unselected package openssh-sftp-server.
(Reading database ... 204287 files and directories currently installed.)
Preparing to unpack .../openssh-sftp-server_1%3a8.9p1-3_amd64.deb ...
```



```

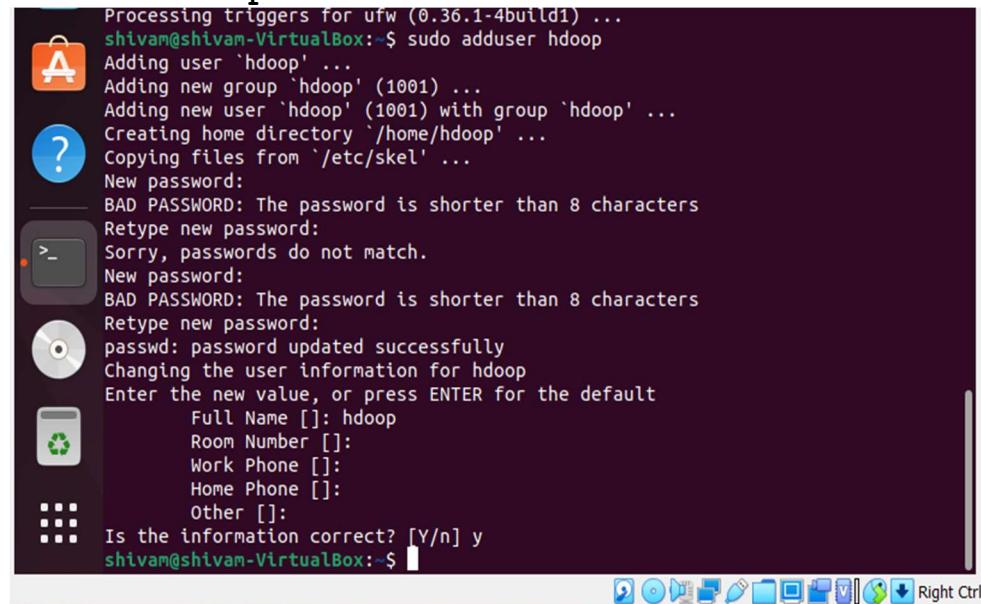
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Oct 26 20:14
shivam@shivam-VirtualBox: ~
Selecting previously unselected package ncurses-term.
Preparing to unpack .../ncurses-term_6.3-2_all.deb ...
Unpacking ncurses-term (6.3-2) ...
Selecting previously unselected package ssh-import-id.
Preparing to unpack .../ssh-import-id_5.11-0ubuntu1_all.deb ...
Unpacking ssh-import-id (5.11-0ubuntu1) ...
Setting up openssh-sftp-server (1:8.9p1-3) ...
Setting up openssh-server (1:8.9p1-3) ...

Creating config file /etc/ssh/sshd_config with new version
Creating SSH2 RSA key; this may take some time ...
3072 SHA256:8PzBkmp09Id6UiAH13iLdLXXhw5Y Gew00tg67Q15iw root@shivam-VirtualBox
(RSA)
Creating SSH2 ECDSA key; this may take some time ...
256 SHA256:56CFgnEkdxp138v74gUOMoM6+D+haFlnLU+ygC4Cc root@shivam-VirtualBox
(ECDSA)
Creating SSH2 ED25519 key; this may take some time ...
256 SHA256:kibmsgvNwbIp08QgBL21YCtnh+brCk3oEBpOR/bPXjs root@shivam-VirtualBox
(ED25519)
Created symlink /etc/systemd/system/sshd.service → /lib/systemd/system/ssh.service.
Created symlink /etc/systemd/system/multi-user.target.wants/ssh.service → /lib/
systemd/system/ssh.service.
rescue-ssh.target is a disabled or a static unit, not starting it.
ssh.socket is a disabled or a static unit, not starting it.
Setting up ssh-import-id (5.11-0ubuntu1) ...
Setting up ncurses-term (6.3-2) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for ufw (0.36.1-4build1) ...

```

- Add new user by running

```
sudo adduser hdoop
```



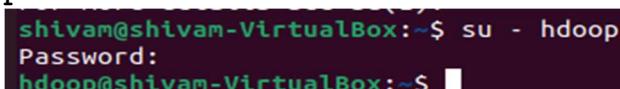
```

Processing triggers for ufw (0.36.1-4build1) ...
shivam@shivam-VirtualBox: ~$ sudo adduser hdoop
Adding user 'hdoop' ...
Adding new group 'hdoop' (1001) ...
Adding new user 'hdoop' (1001) with group 'hdoop' ...
Creating home directory '/home/hdoop' ...
Copying files from '/etc/skel' ...
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
Sorry, passwords do not match.
New password:
BAD PASSWORD: The password is shorter than 8 characters
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 []:
      Work Phone []:
      Home Phone []:
      Other []:
Is the information correct? [Y/n] y
shivam@shivam-VirtualBox: ~$ 

```

- Login with the same user

```
su - hdoop
```



```

shivam@shivam-VirtualBox: ~$ su - hdoop
Password:
hdoop@shivam-VirtualBox: ~$ 

```

- Generate a key through which is used for connection (both public and private key)

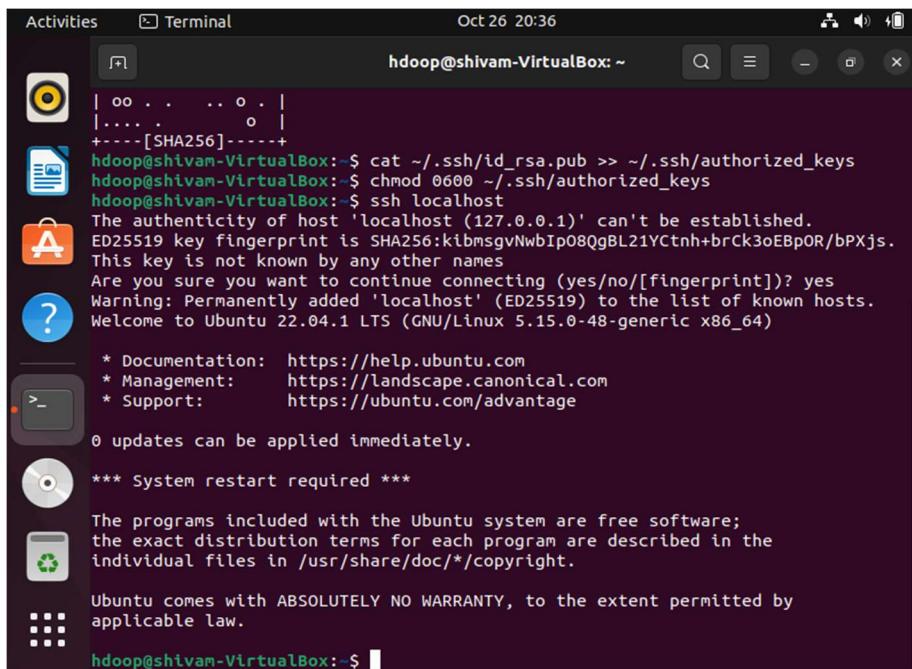
```
ssh-keygen -t rsa -P '' -f ~/.ssh/id_rsa
```

```
hdoop@shivam-VirtualBox:~$ ssh-keygen -t rsa -P '' -f ~/.ssh/id_rsa
Generating public/private rsa key pair.
Created directory '/home/hdoop/.ssh'.
Your identification has been saved in /home/hdoop/.ssh/id_rsa
Your public key has been saved in /home/hdoop/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:MO7AGnr6k30khZJn9XeKnIdPeAEjHaf8mxOLzNn0n1A hdoop@shivam-VirtualBox
The key's randomart image is:
+---[RSA 3072]---+
|   ...
|   o+o
|   .oooo
|   o.+o..o .
|   .+o...S*++ E
|   .o.o.o*==* .
|   oo o. ==* o
|   oo . . .. o .
|   .... . o |
+---[SHA256]---+
hdoop@shivam-VirtualBox:~$
```

- add these key pairs to the ssh authorized_keys - cat
~/ssh/id_rsa.pub >> ~/ssh/authorized_keys
- ```
hdoop@shivam-VirtualBox:~$ cat ~/ssh/id_rsa.pub >> ~/ssh/authorized_keys
hdoop@shivam-VirtualBox:~$
```
- Set the permissions for your user - chmod 0600  
~/ssh/authorized\_keys OR chmod 640 ~/ssh/authorized\_keys

```
hdoop@shivam-VirtualBox:~$ cat ~/ssh/id_rsa.pub >> ~/ssh/authorized_keys
hdoop@shivam-VirtualBox:~$ chmod 0600 ~/ssh/authorized_keys
```

- The new user is now able to SSH without needing to enter a password every time. Verify everything is set up correctly by using the user to SSH to localhost - **ssh localhost**
- 



```

Activities Terminal Oct 26 20:36
hadoop@shivam-VirtualBox:~$ cat ~/.ssh/id_rsa.pub >> ~/.ssh/authorized_keys
hadoop@shivam-VirtualBox:~$ chmod 0600 ~/.ssh/authorized_keys
hadoop@shivam-VirtualBox:~$ ssh localhost
The authenticity of host 'localhost (127.0.0.1)' can't be established.
ED25519 key fingerprint is SHA256:kibmsgvNwbIp08QgBL21YCtnh+brCk3oEBpOR/bPXjs.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'localhost' (ED25519) to the list of known hosts.
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-48-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

0 updates can be applied immediately.

*** System restart required ***

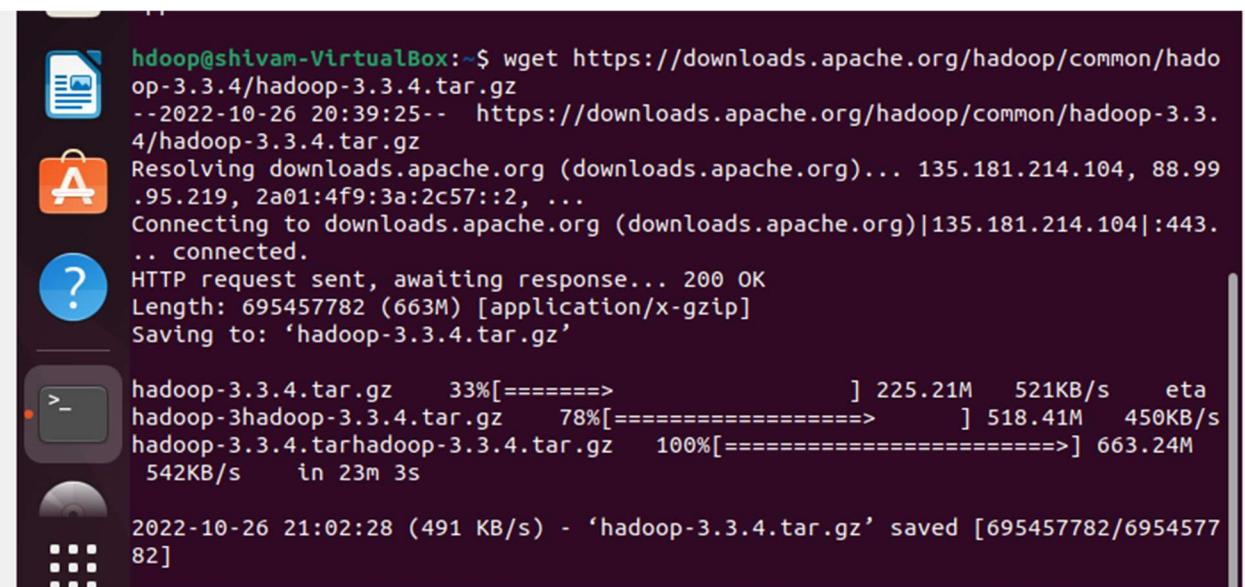
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

hadoop@shivam-VirtualBox:~$

```

- Download the Hadoop Package – wget  
<https://downloads.apache.org/hadoop/common/hadoop-3.3.4/hadoop-3.3.4.tar.gz>
- 



```

hadoop@shivam-VirtualBox:~$ wget https://downloads.apache.org/hadoop/common/hadoop-3.3.4/hadoop-3.3.4.tar.gz
--2022-10-26 20:39:25-- https://downloads.apache.org/hadoop/common/hadoop-3.3.4/hadoop-3.3.4.tar.gz
Resolving downloads.apache.org (downloads.apache.org)... 135.181.214.104, 88.99.95.219, 2a01:4f9:3a:2c57::2, ...
Connecting to downloads.apache.org (downloads.apache.org)|135.181.214.104|:443...
.. connected.
HTTP request sent, awaiting response... 200 OK
Length: 695457782 (663M) [application/x-gzip]
Saving to: 'hadoop-3.3.4.tar.gz'

hadoop-3.3.4.tar.gz 33%[=====] 225.21M 521KB/s eta
hadoop-3.3.4.tar.gz 78%[=====] 518.41M 450KB/s
hadoop-3.3.4.tar.gz 100%[=====] 663.24M
542KB/s in 23m 3s

2022-10-26 21:02:28 (491 KB/s) - 'hadoop-3.3.4.tar.gz' saved [695457782/695457782]

```

- Extract the downloaded “hadoop-3.3.4.tar.gz” file with the tar command - **tar -xvzf hadoop-3.3.4.tar.gz**

```

hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/css/maven-base.css
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/css/print.css
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/css/maven-theme.css
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/css/site.css
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/breadcrumbs.jpg
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/apache-maven-project-2.png
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/maven-logo-2.gif
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/collapsed.gif
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/logo_maven.jpg
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/icon_warning_sml.gif
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/logos/
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/logos/build-by-maven-black
.png
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/logos/maven-feather.png
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/logos/build-by-maven-white
.png
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/banner.jpg
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/h5.jpg
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/icon_error_sml.gif
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/icon_success_sml.gif
Terminal 3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/expanded.gif
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/external.png
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/icon_info_sml.gif
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/logo_apache.jpg
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/bg.jpg
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/newwindow.png
hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/h3.jpg

```

- rename the extracted directory - **mv hadoop-3.3.4 hadoop**

```

hadoop-3.3.4/share/doc/hadoop/hadoop-hdfs-nfs/images/h3.jpg
hadoop@shivam-VirtualBox:~$ mv hadoop-3.3.4 hadoop

```

Now we will change the 6 importat downloaded file

Open the “`~/.bashrc`” file in your “`nano`” text editor - `nano ~/.bashrc`

Add the following paths in the opened “`~/.bashrc`” file:

```

export JAVA_HOME=/usr/lib/jvm/java-11-openjdk-amd64 export
HADOOP_HOME=/home/username/hadoop export
HADOOP_INSTALL=$HADOOP_HOME

```

```

export HADOOP_MAPRED_HOME=$HADOOP_HOME export
HADOOP_COMMON_HOME=$HADOOP_HOME export
HADOOP_HDFS_HOME=$HADOOP_HOME export
HADOOP_YARN_HOME=$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/native"

```

```

GNU nano 4.8 .bashrc Modified
. /etc/bash_completion
fi
fi
#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"

Save modified buffer?
Y Yes
N No ^C Cancel

```

write out the to activate the “JAVA\_HOME” environment variable - **source ~/.bashrc**

```

hdoop@aman-VirtualBox:~$ source ~./.bashrc
-bash: export: `HADOOP_OPTS-Djava.library.path=/home/hdoop/hadoop-3.2.1/lib/native': not a valid identifier
hdoop@aman-VirtualBox:~$

```

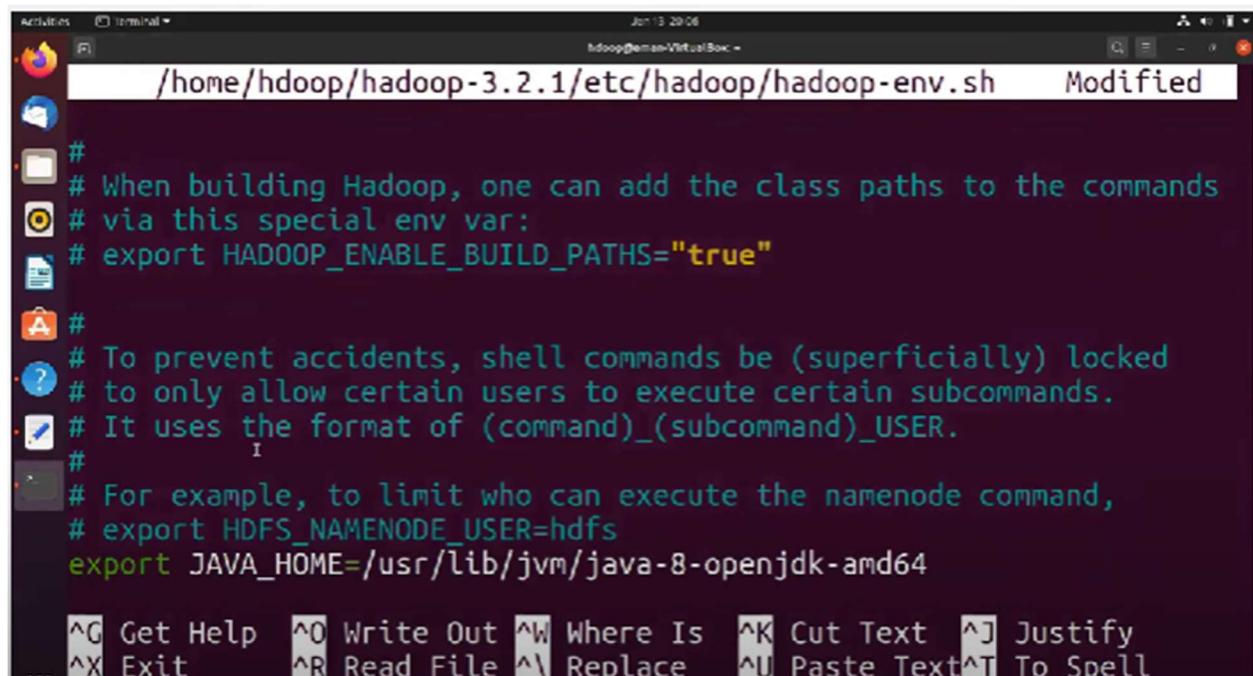
open up the environment variable file of Hadoop - nano

**\$HADOOP\_HOME/etc/hadoop/hadoop-env.sh**

Here we will give java path

```
hadoop@aman-VirtualBox:~$ sudo nano $HADOOP_HOME/etc/hadoop/hadoop-env.sh
```

set “JAVA\_HOME” variable in the Hadoop environment-  
**export JAVA\_HOME=/usr/lib/jvm/java-11-openjdk-amd64**



```
When building Hadoop, one can add the class paths to the commands
via this special env var:
export HADOOP_ENABLE_BUILD_PATHS="true"

#
To prevent accidents, shell commands be (superficially) locked
to only allow certain users to execute certain subcommands.
It uses the format of (command)_(subcommand)_USER.

#
For example, to limit who can execute the namenode command,
export HDFS_NAMENODE_USER=hdfs
export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64
```

Update is the “yarn-site.xml - nano

**\$HADOOP\_HOME/etc/hadoop/yarn-site.xml**

Write out below-given lines

```
<configuration>
<property>
<name>yarn.nodemanager.aux-services</name>
<value>mapreduce_shuffle</value>
</property>
</configuration>
```

```
hadoop@aman-VirtualBox:~$ sudo nano $HADOOP_HOME/etc/hadoop/core-site.xml
```

```
/home/hadoop/hadoop-3.2.1/etc/hadoop/core-site.xml Modified

<!-- Put site-specific property overrides in this file. -->

<configuration><property>
 <name>hadoop.tmp.dir</name>
 <value>/home/hadoop/tmpdata</value>
 <description>A base for other temporary directories.</description>
</property>
<property>
 <name>fs.default.name</name>
 <value>hdfs://localhost:9000</value>
 <description>The name of the default file system. A URI whi
</property>
</configuration>

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Paste Text^T To Spell
```

```
sudo nano $HADOOP_HOME/etc/hadoop/hdfs-site.xml
```

```
#Add below lines in this file(between "<configuration>" and "</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>
<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>
```

**^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify**

## This is for map reduce

sudo nano \$HADOOP\_HOME/etc/hadoop/mapred-site.xml

#Add below lines in this file(between "<configuration>" and "</configuration>")

```
<property>
<name>mapreduce.framework.name</name>
<value>yarn</value>
</property>
```

```
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. -->

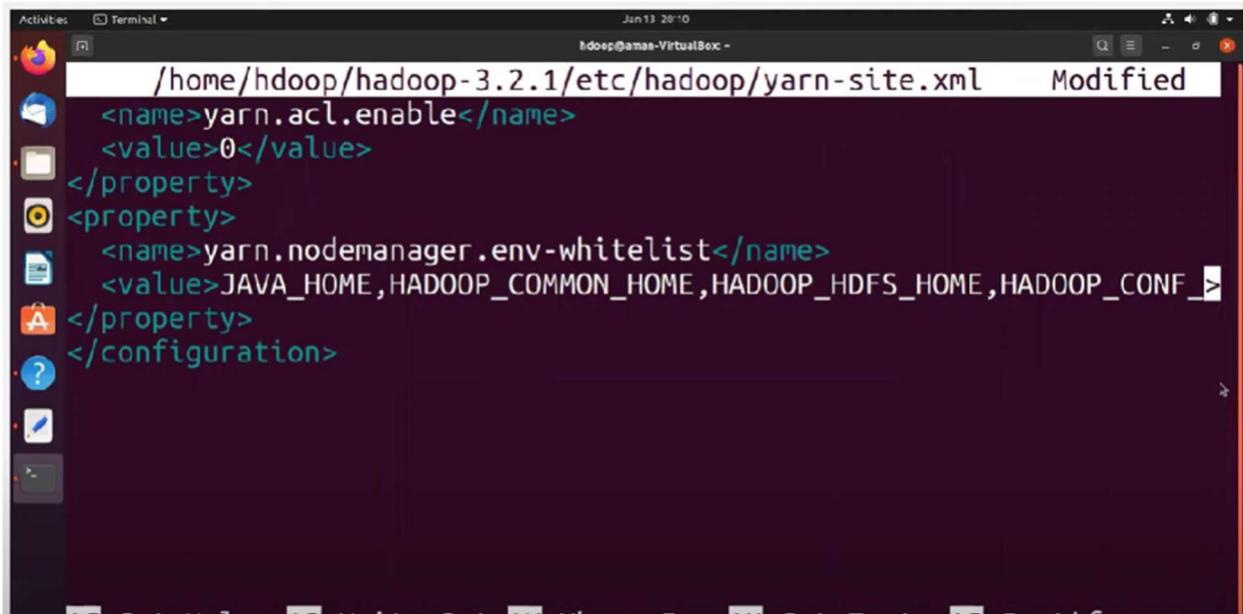
```
<configuration>
<configuration>
<property>
 <name>mapreduce.framework.name</name>
 <value>yarn</value>
</property>
```

**^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify**  
**^X Exit ^R Read File ^V Replace ^U Paste Text ^T To Spell**

```
sudo nano $HADOOP_HOME/etc/hadoop/yarn-site.xml
```

```
#Add below lines in this file(between "<configuration>" and "</configuration>")
```

```
<property>
 <name>yarn.nodemanager.aux-services</name>
 <value>mapreduce_shuffle</value>
</property>
<property>
 <name>yarn.nodemanager.aux-services.mapreduce.shuffle.class</name>
 <value>org.apache.hadoop.mapred.ShuffleHandler</value>
</property>
<property>
 <name>yarn.resourcemanager.hostname</name>
 <value>127.0.0.1</value>
</property>
<property>
 <name>yarn.acl.enable</name>
 <value>0</value>
</property>
<property>
 <name>yarn.nodemanager.env-whitelist</name>
 <value>JAVA_HOME,HADOOP_COMMON_HOME,HADOOP_HDFS_HOME,
 ,HADOOP_CONF_DIR,CLASSPATH_PERPEND_DISTCACHE,HADOOP_YA
 RN_HOME,HADOOP_MAPRED_HOME</value>
</property>
```



```
/home/hadoop/hadoop-3.2.1/etc/hadoop/yarn-site.xml Modified
<name>yarn.acl.enable</name>
<value>0</value>
</property>
<property>
<name>yarn.nodemanager.env-whitelist</name>
<value>JAVA_HOME,HADOOP_COMMON_HOME,HADOOP_HDFS_HOME,HADOOP_CONF_DIR</value>
</property>
</configuration>
```

- Before starting Hadoop format the namenode - hdfs namenode -format  
start the Hadoop cluster - start-dfs.sh

```
hadoop@aman-VirtualBox:~/hadoop-3.2.1/sbin$./start-dfs.sh
Starting namenodes on [localhost]
Starting datanodes
Starting secondary namenodes [aman-VirtualBox]
2021-01-13 20:15:32,264 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your pl
atform... using builtin-java classes where applicable
```

- start the “yarn” service of the Hadoop - start-yarn.sh check the status of all services of Hadoop – jps

```
hadoop@aman-VirtualBox:~/hadoop-3.2.1/sbin$./start-yarn.sh
Starting resourcemanager
Starting nodemanagers
```

- To check on browser by entering your IP address with the port 9870

## RESULT:-

We have successfully run the Hadoop framework and create an application using Map Reduce Programming Model