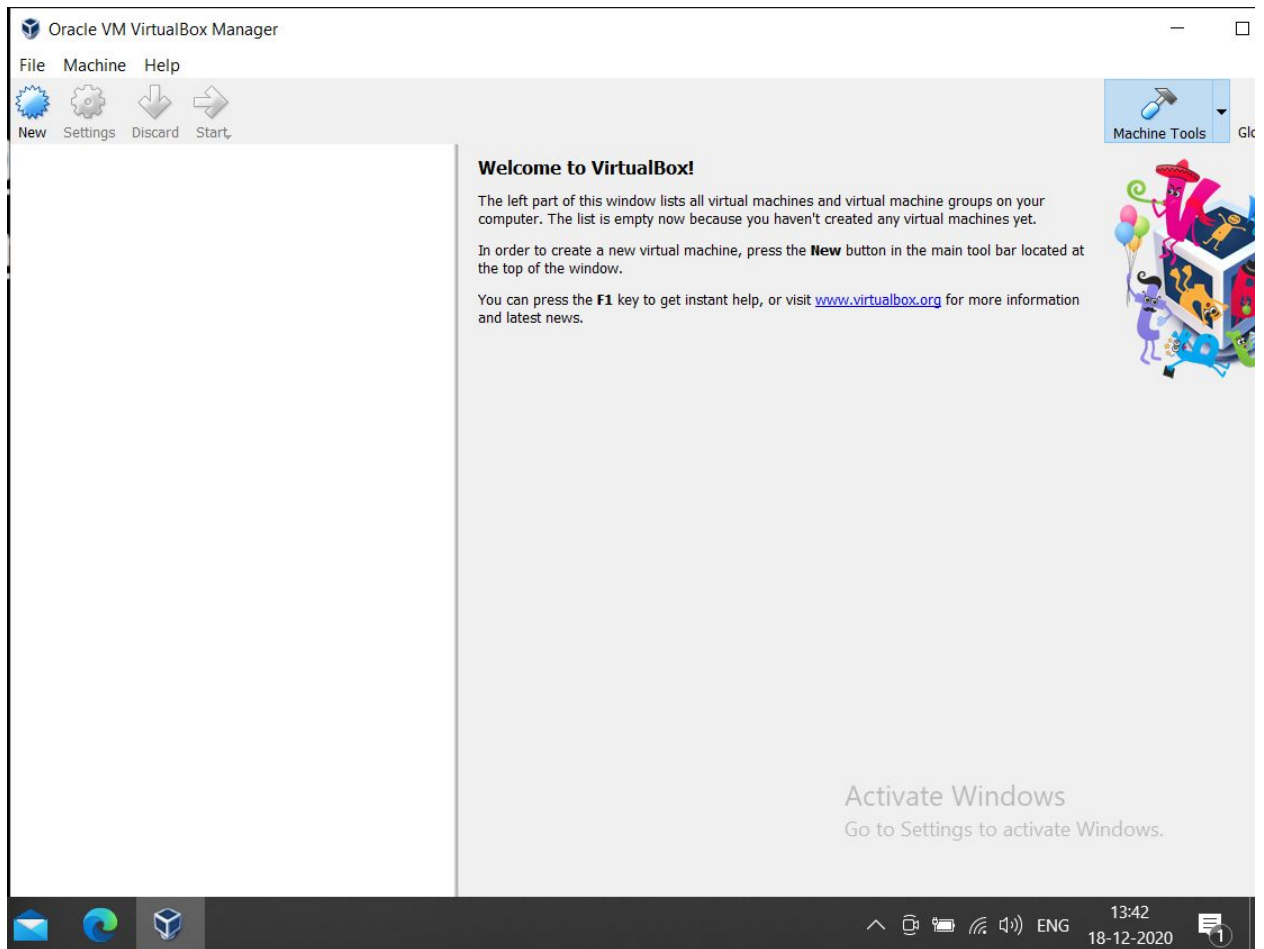
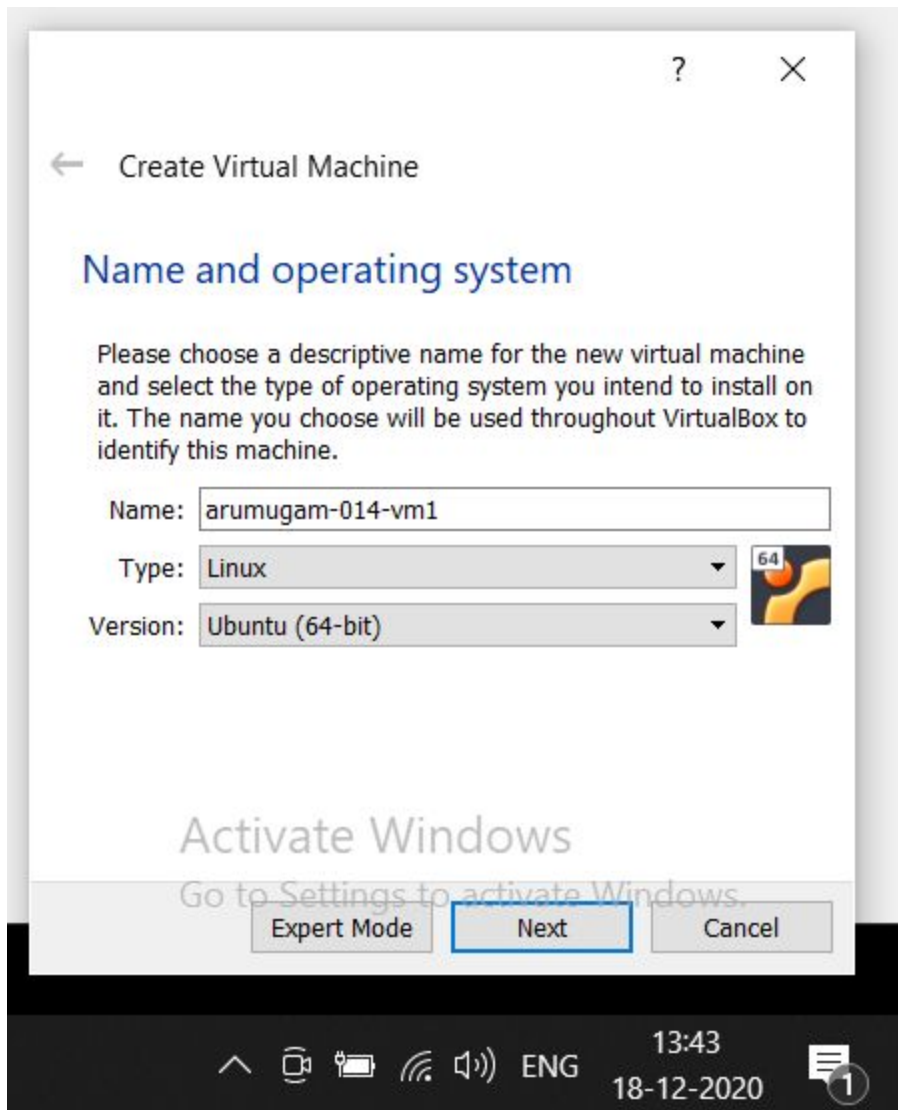


## Procedure with screenshot :

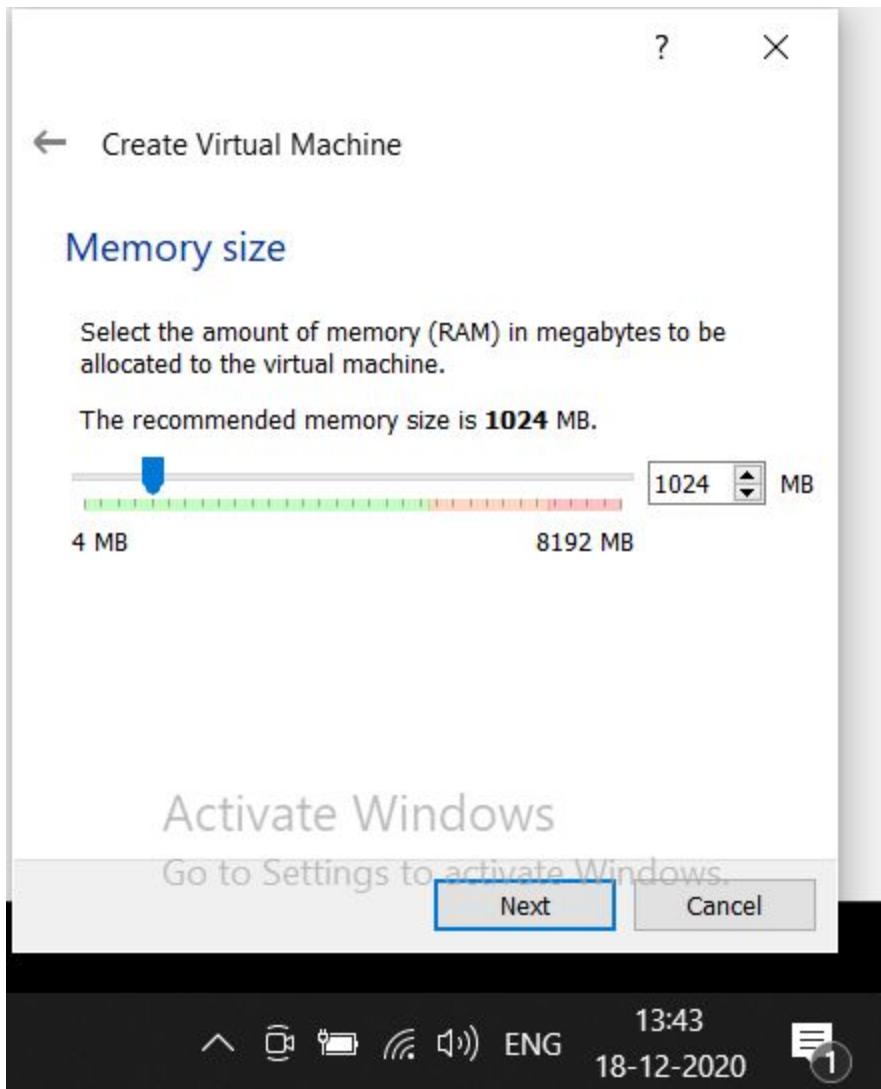
1. Create a VM by clicking on “new button”.



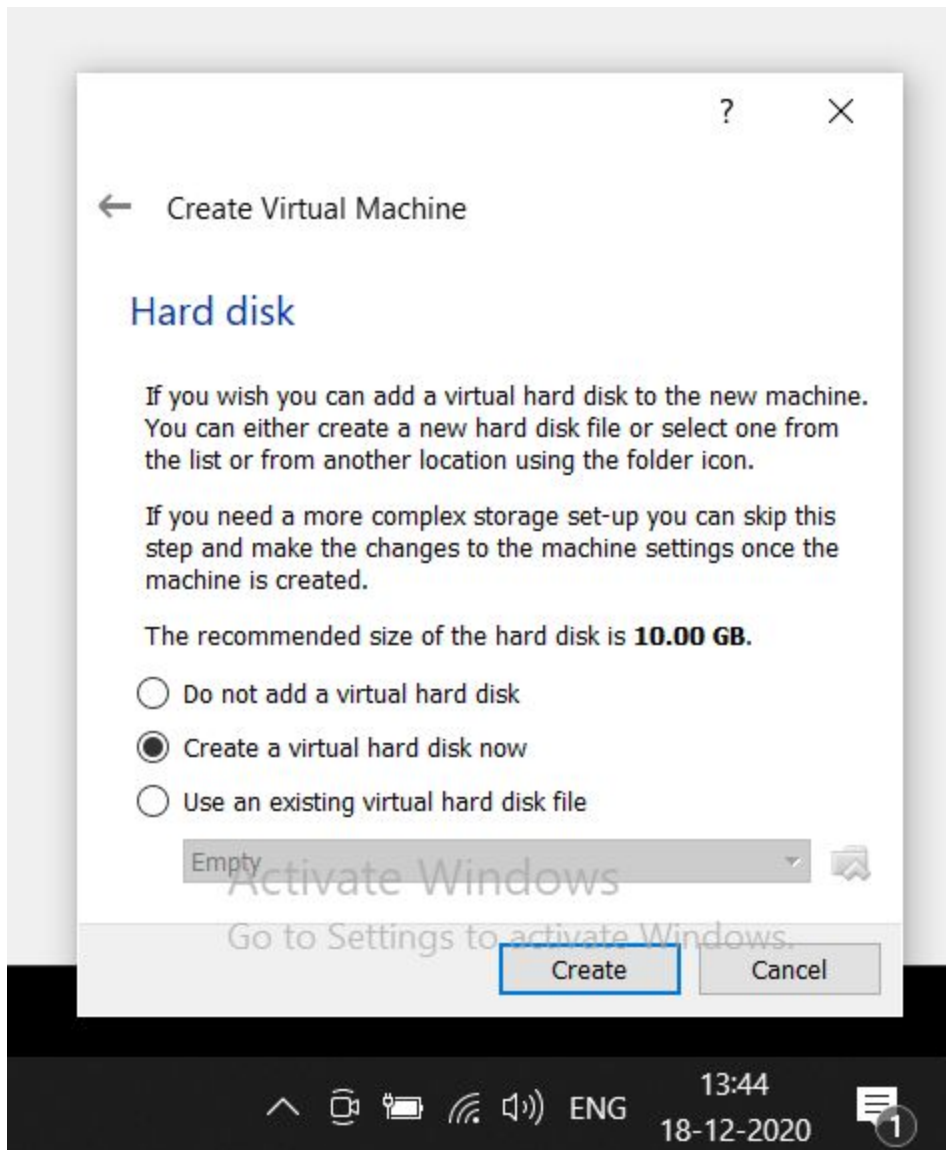
2. Provide a name to the VM and select the type and version of the OS to be installed.



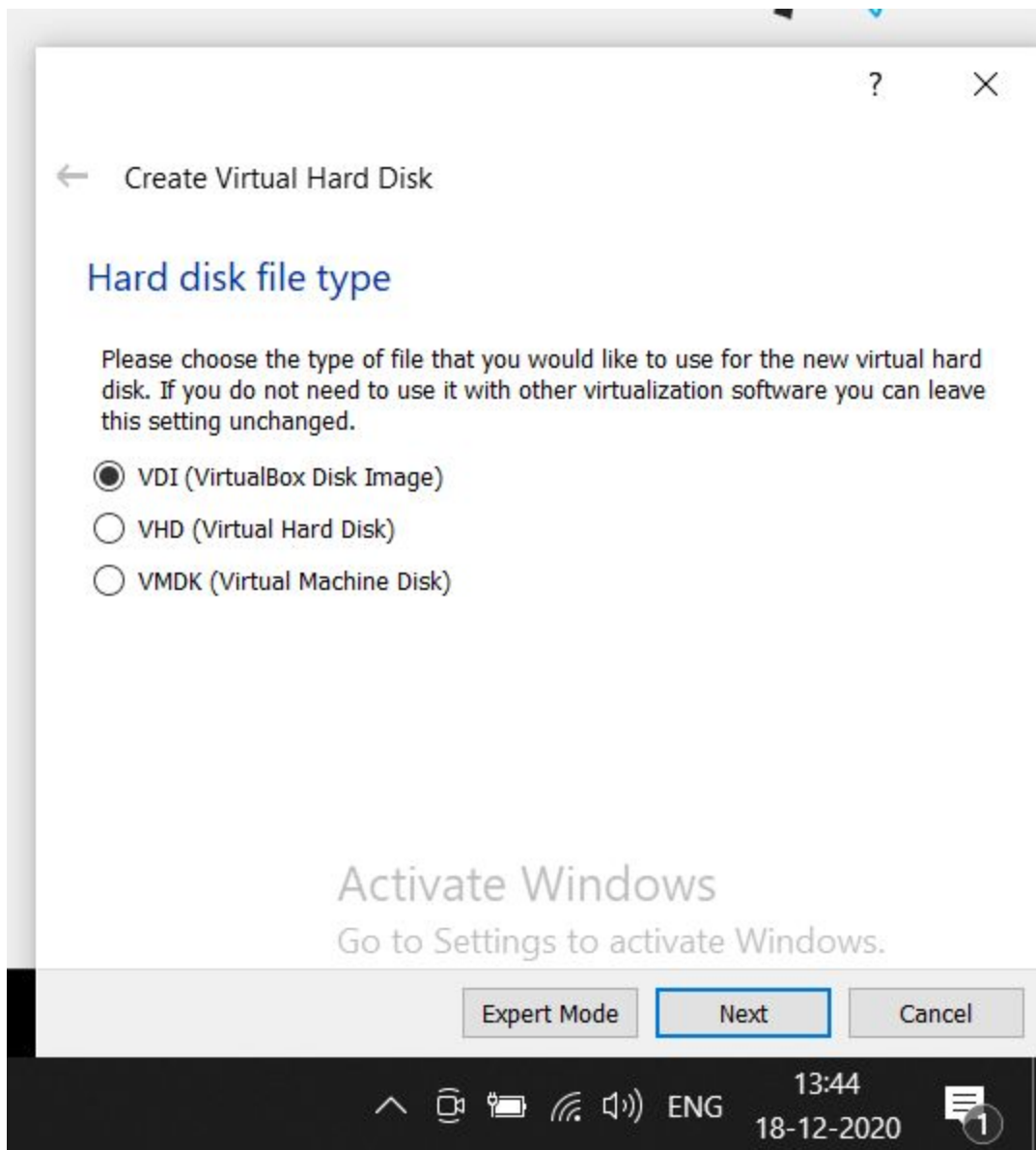
3. Set the memory size for the VM.



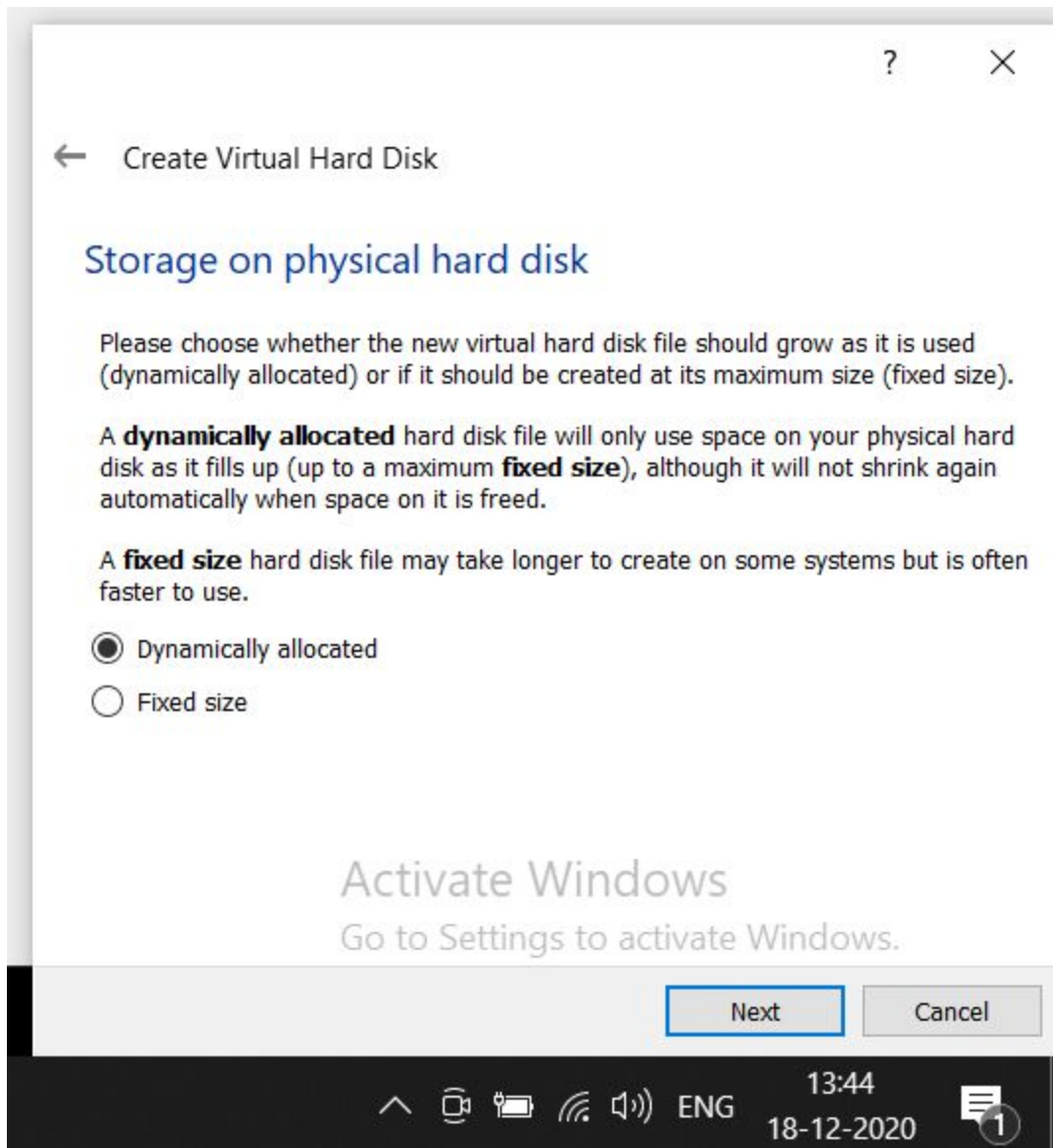
4. Select "Create a virtual hard disk" for hard disk options.



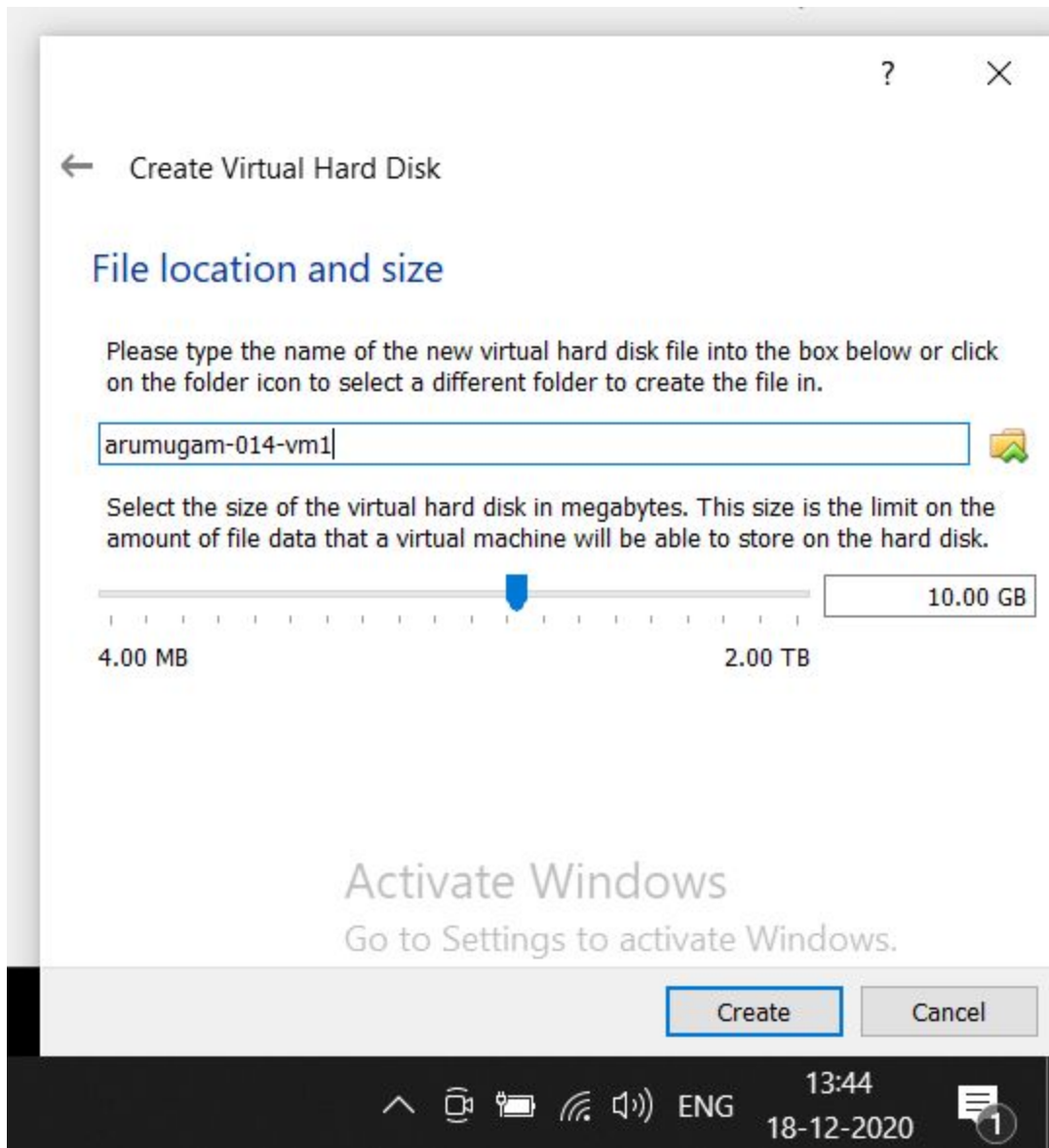
5. Select VDI format for the virtual hard disk for the VM.



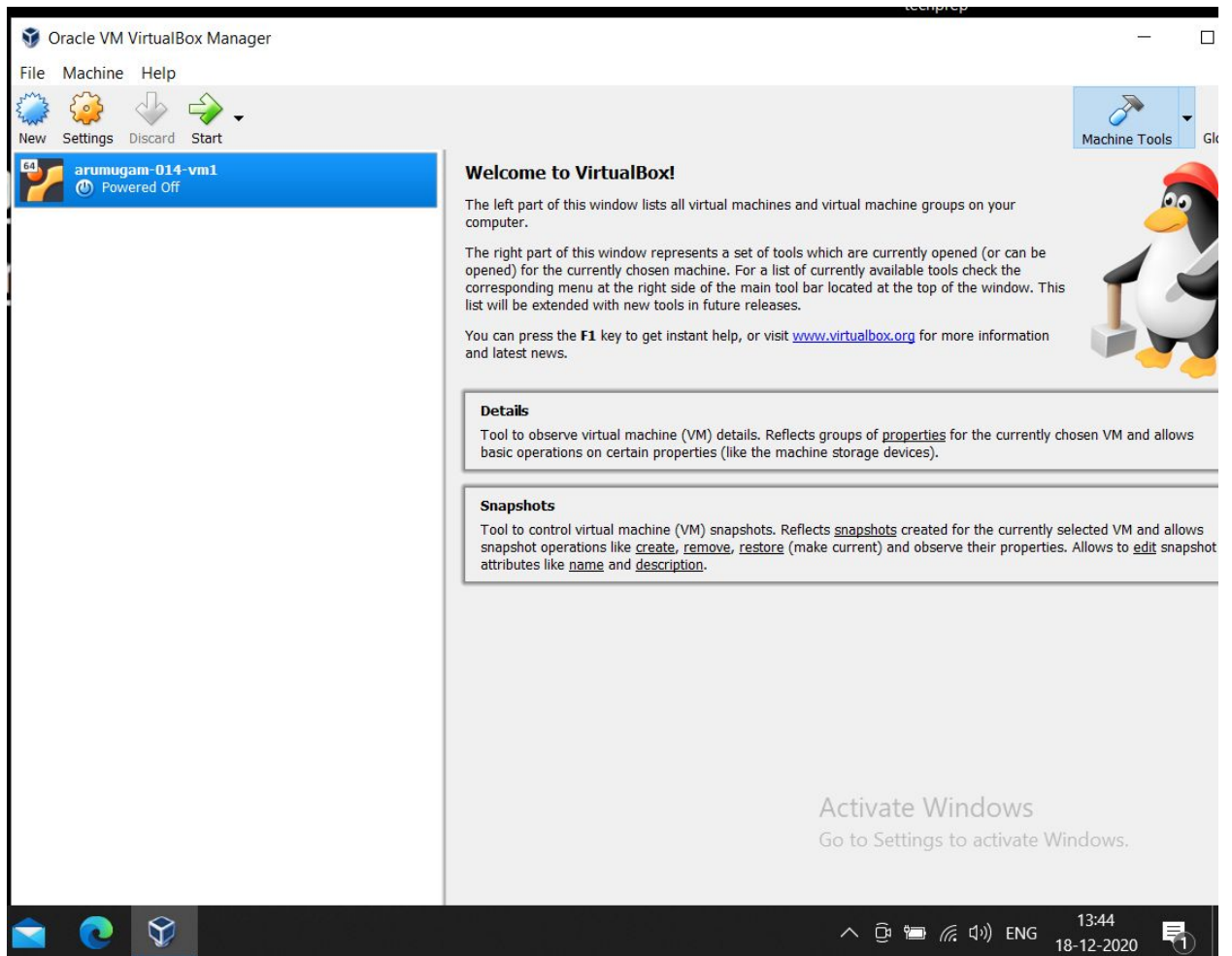
6. Choose dynamically allocated option for storage for physical hard disk.



7. Provide a file location and size for the virtual hard disk to be created for the VM.

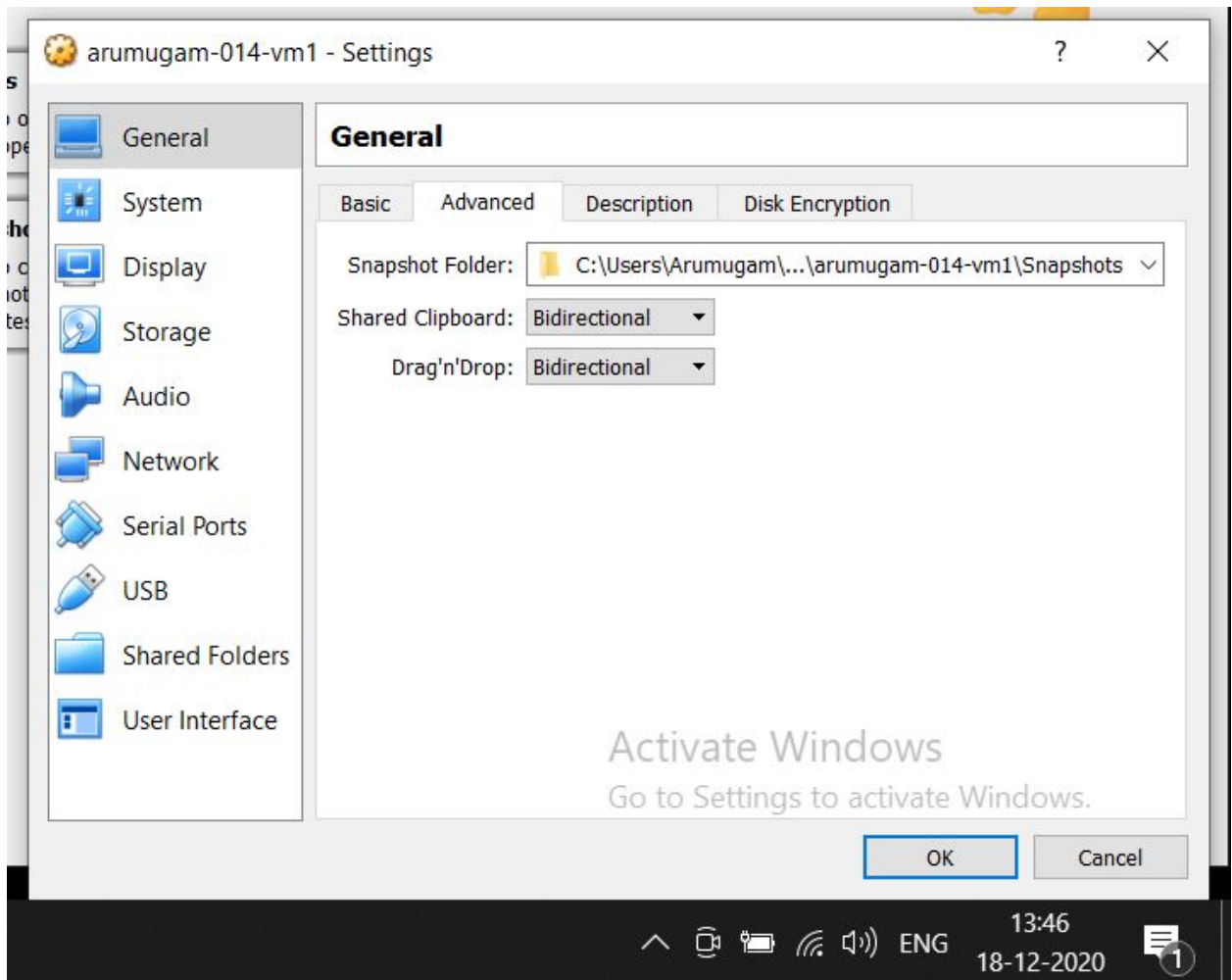


8. Now VM is created. Go to settings tab and set network settings.

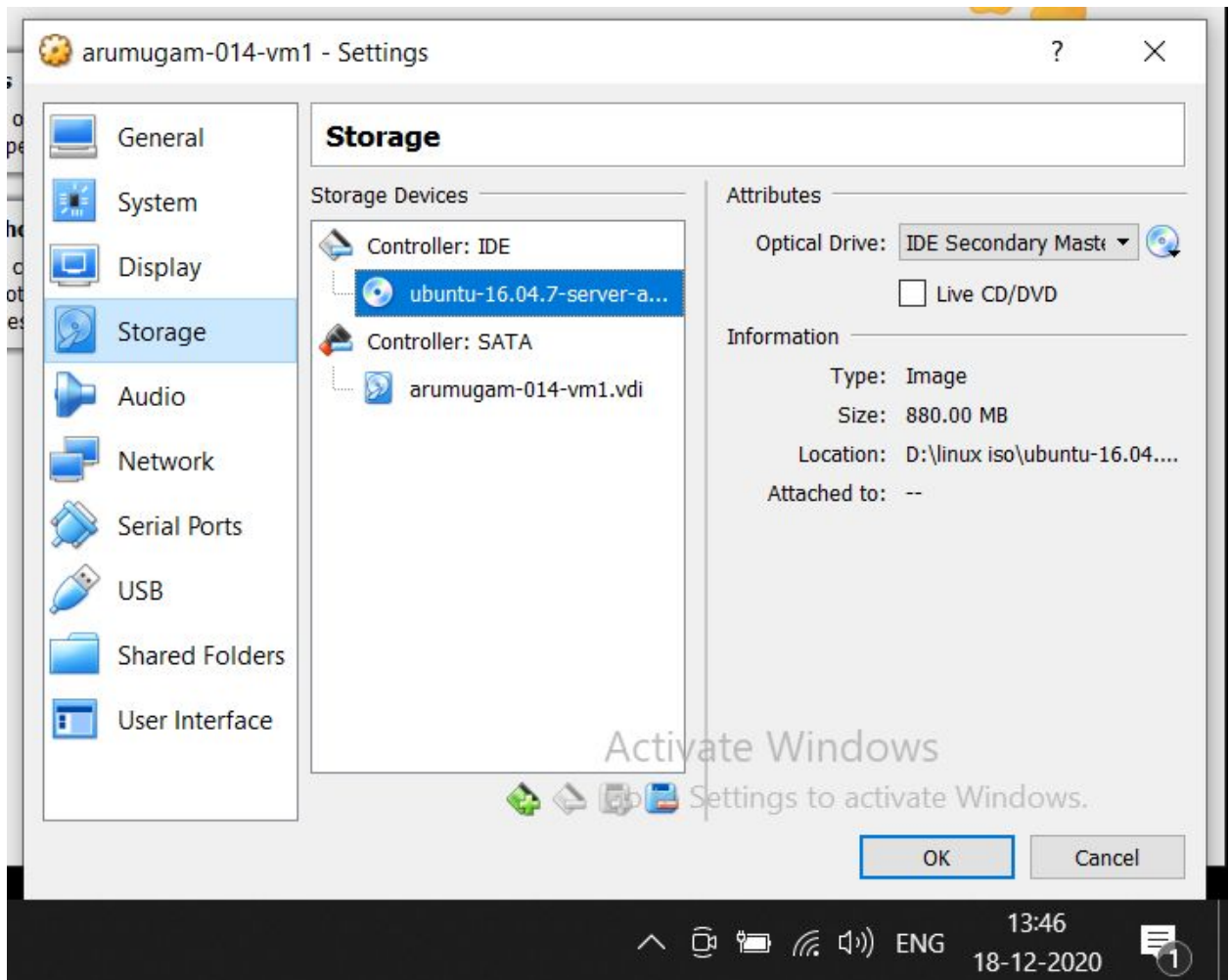




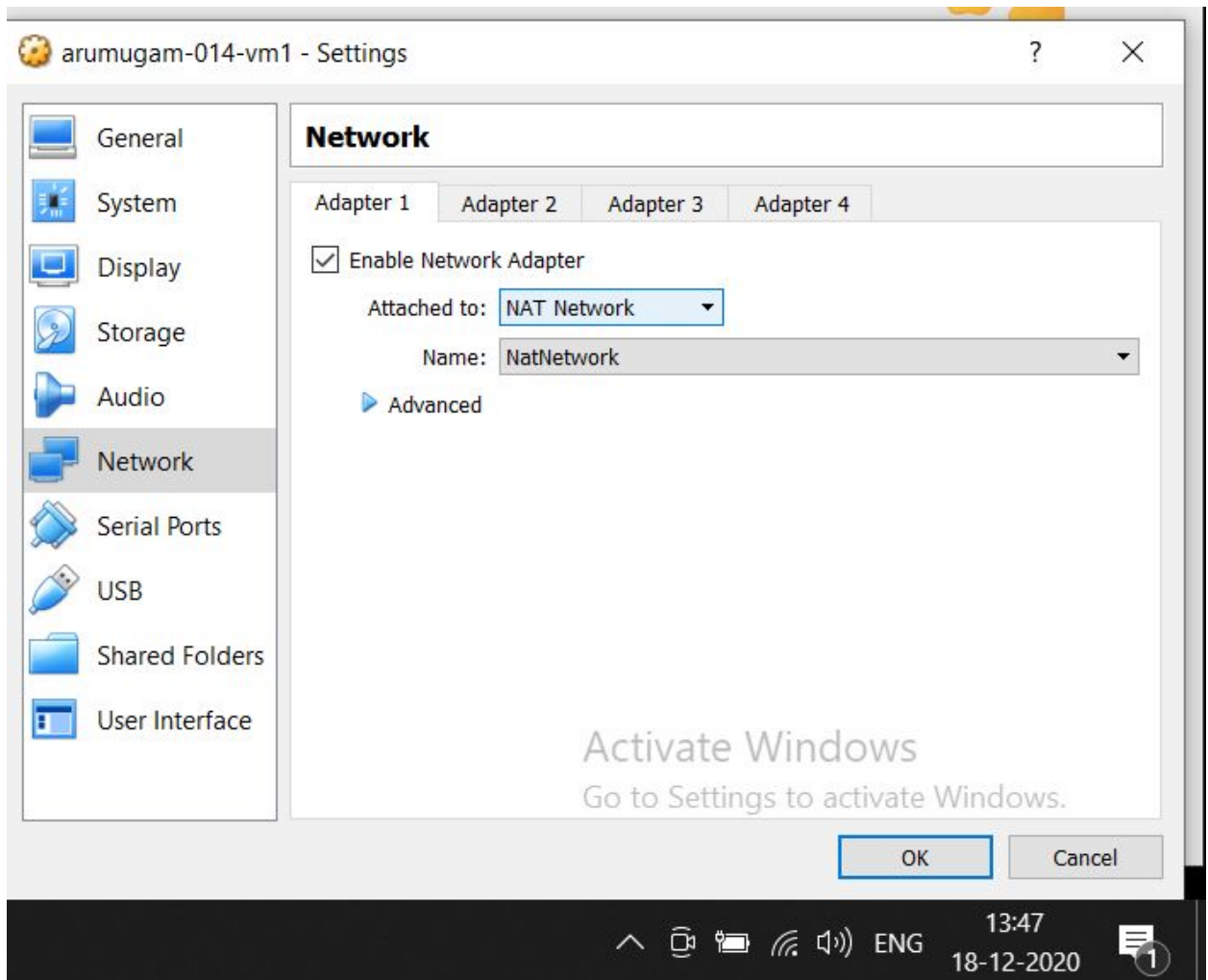
9. Set the shared clipboard and drag'n'drop options to bidirectional.



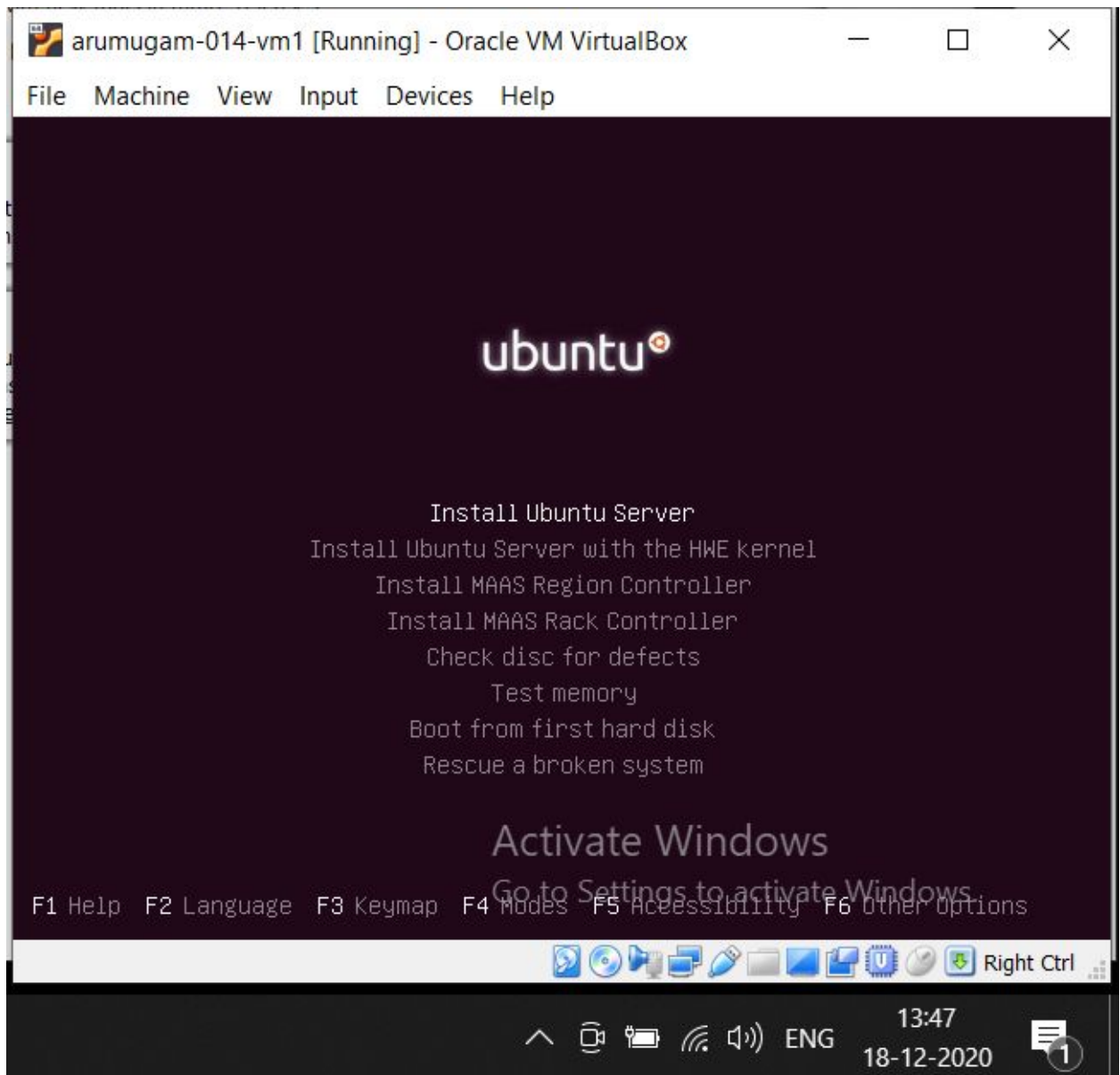
10. Mount the ISO file for the installation of the OS, in this case Ubuntu-16.04 server edition.



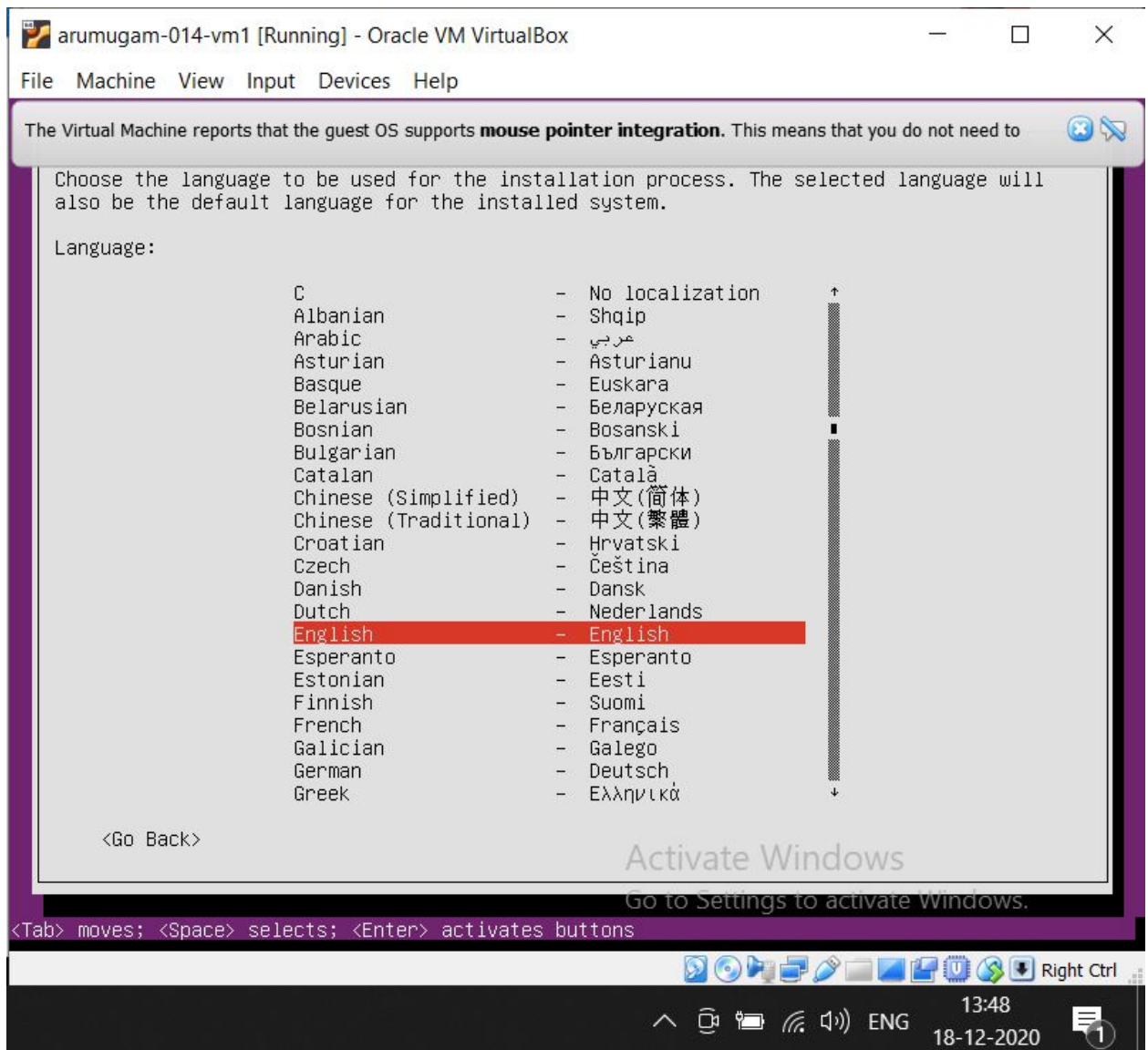
11. Set the network settings to NAT network.



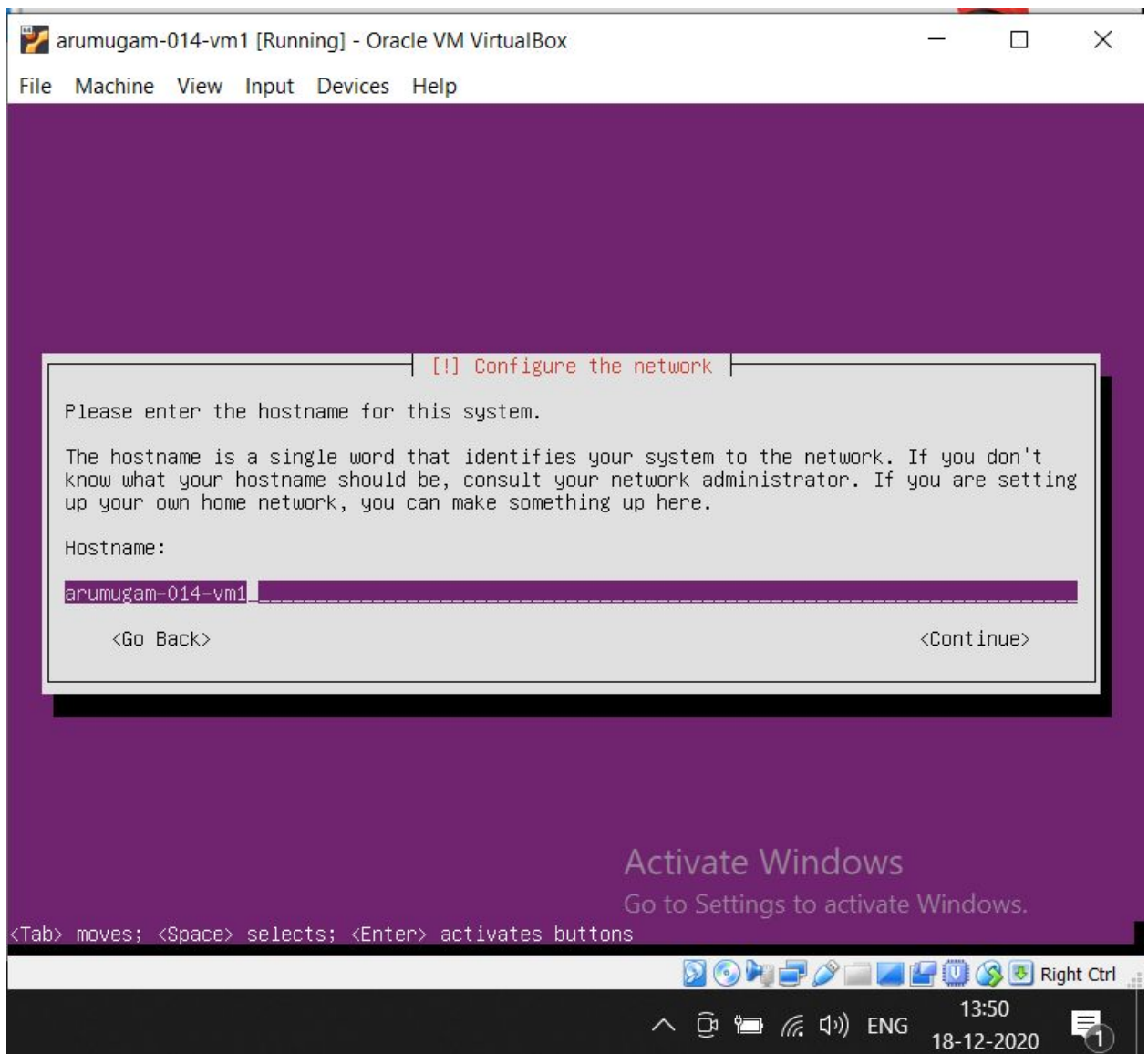
12. Now start the VM and choose “Install ubuntu server” option to start installation process.



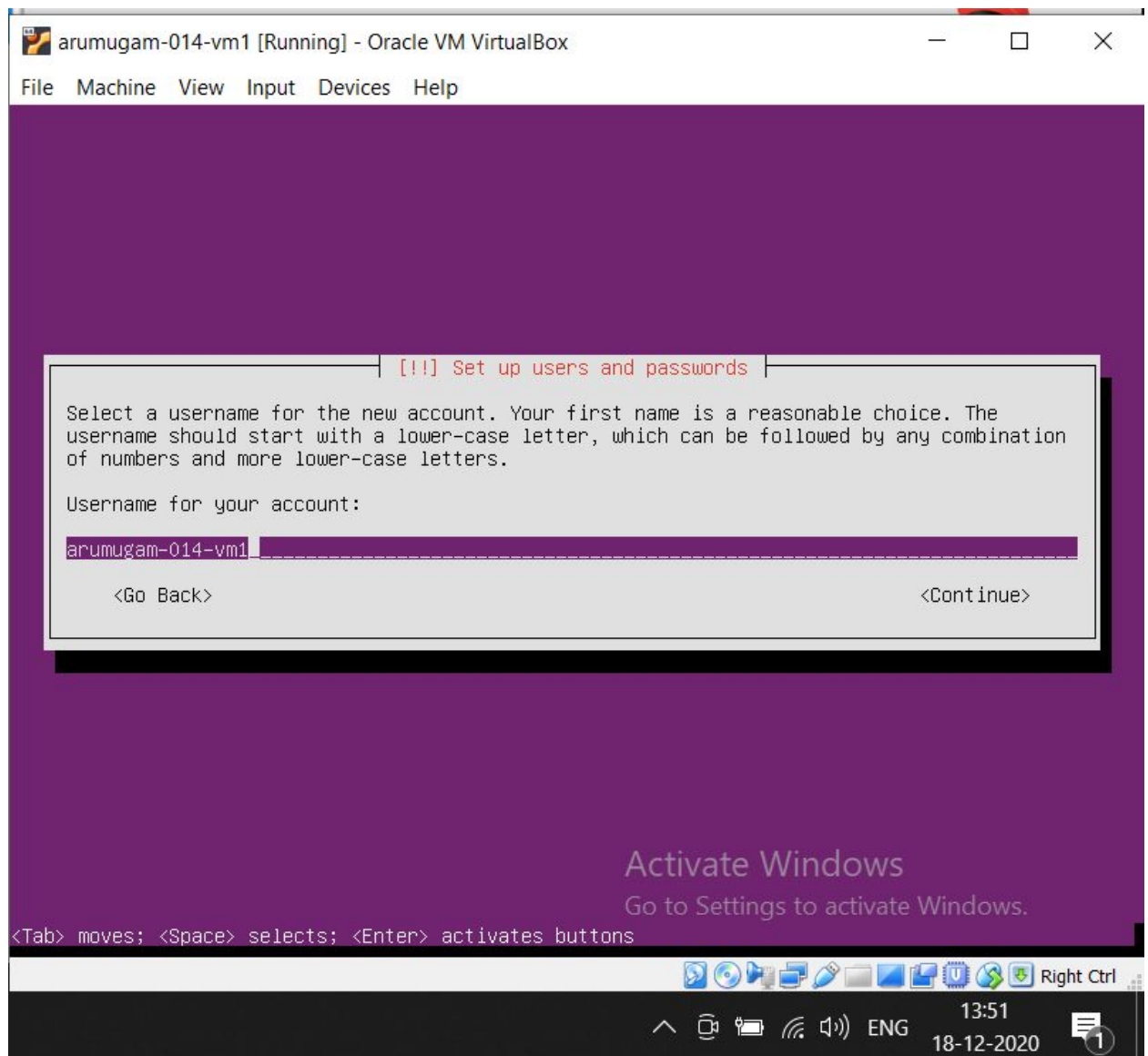
### 13. Select the language and country.



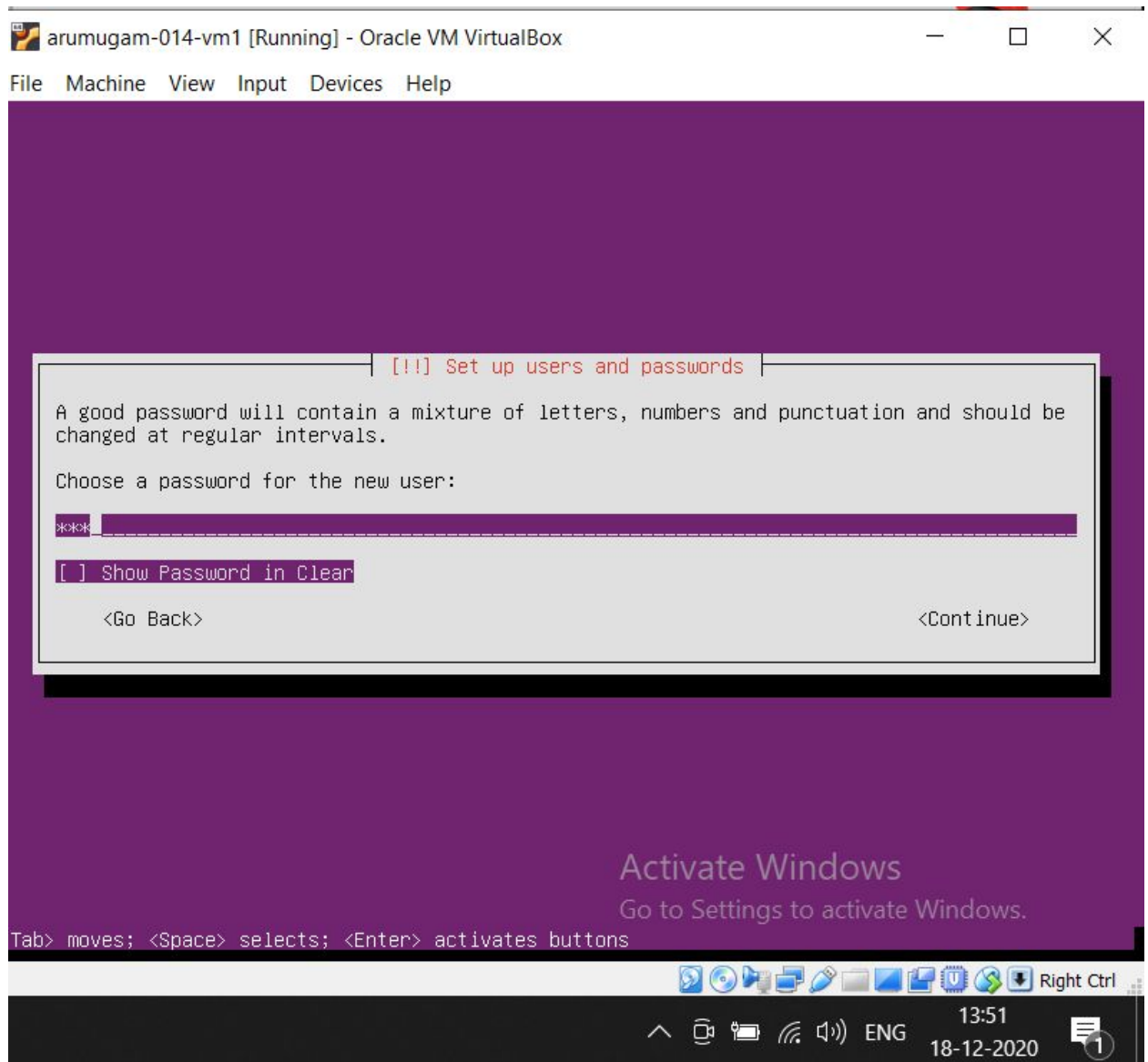
14. Provide the hostname and user's full name.



15. Set a username for the account to be created.

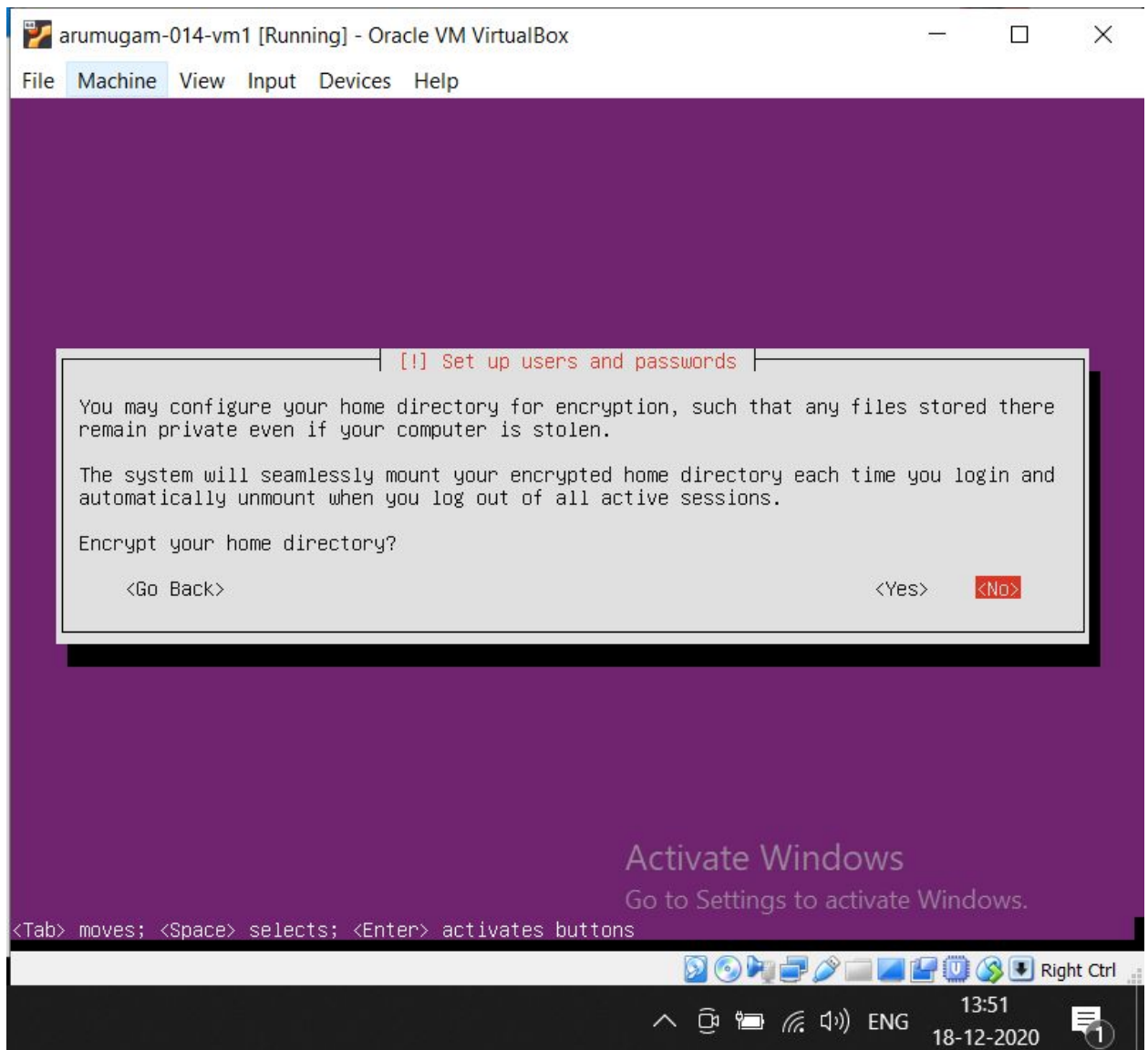


16. Set a password for the username created above.

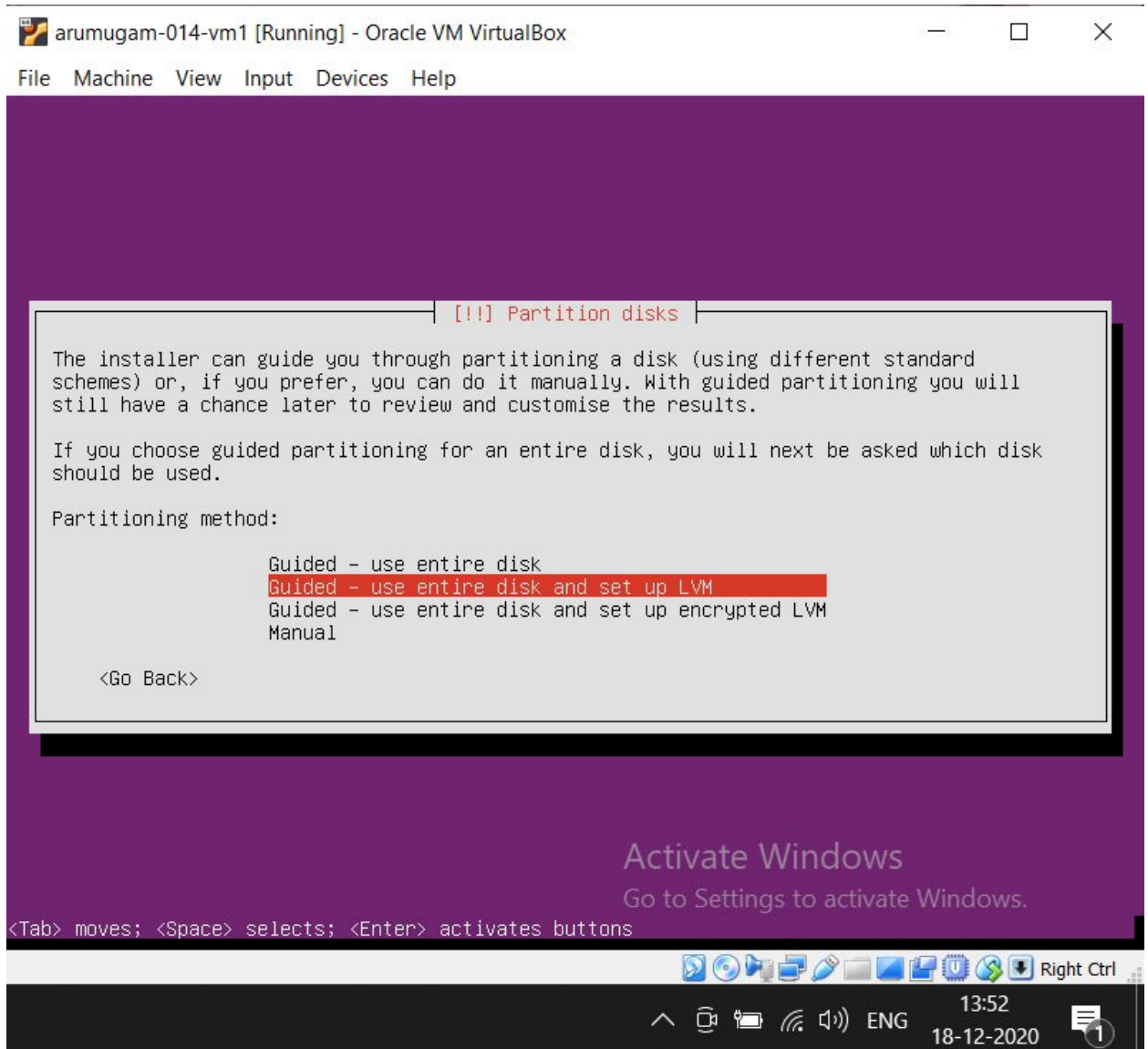




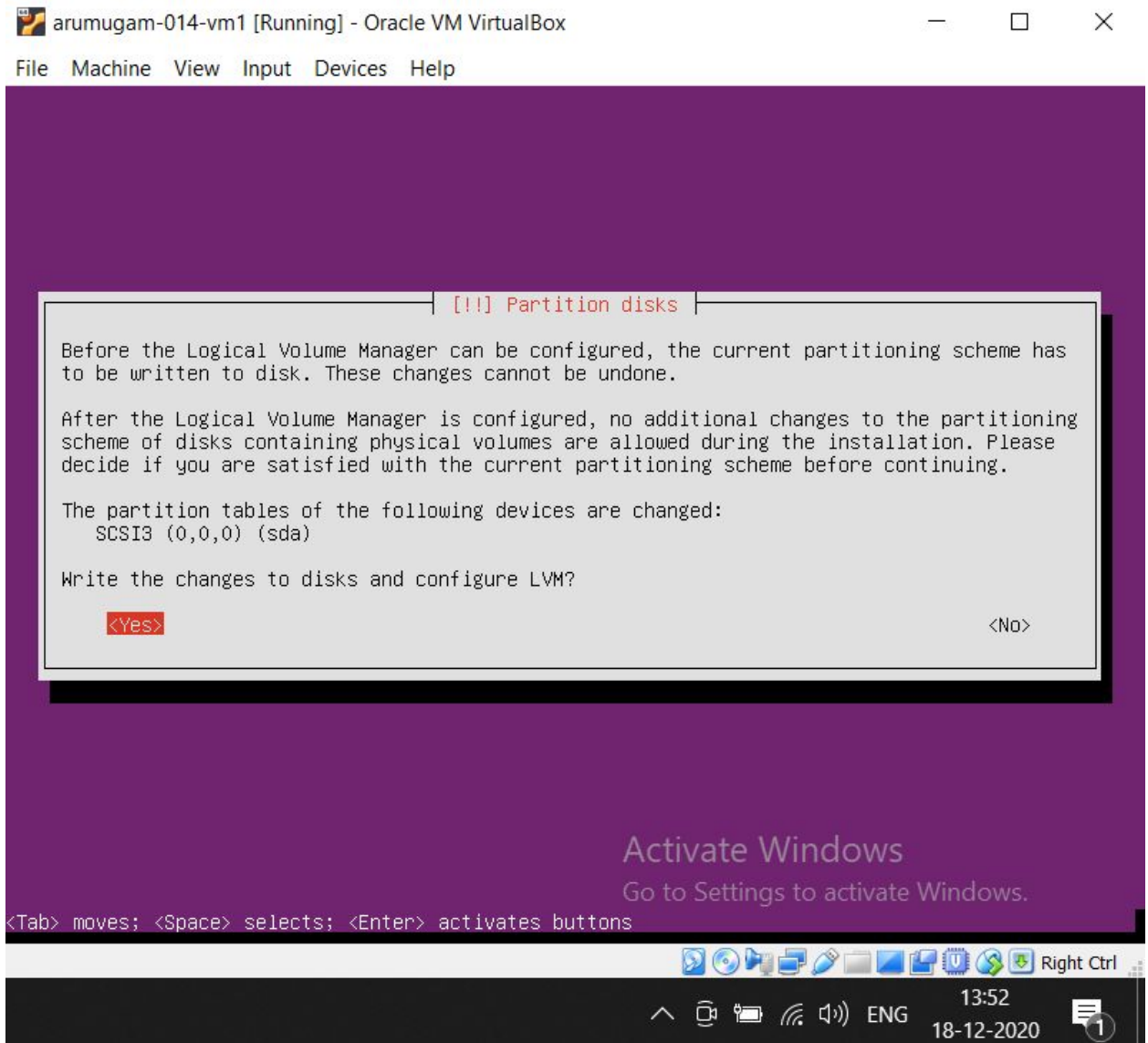
17. Select “no” option to not encrypt your home directory.



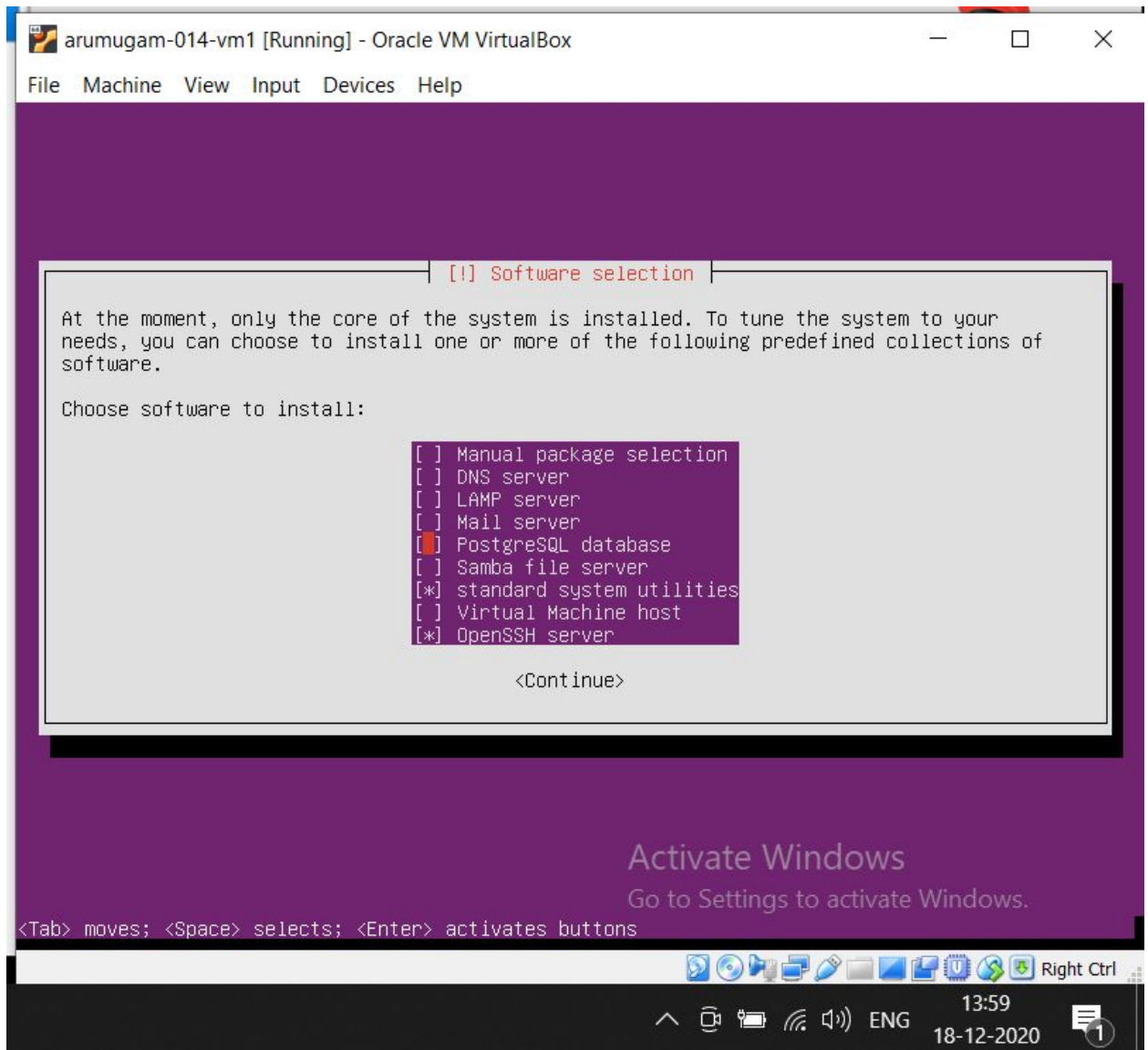
18. Choose "Guided - use entire disk" to continue installation without partition.



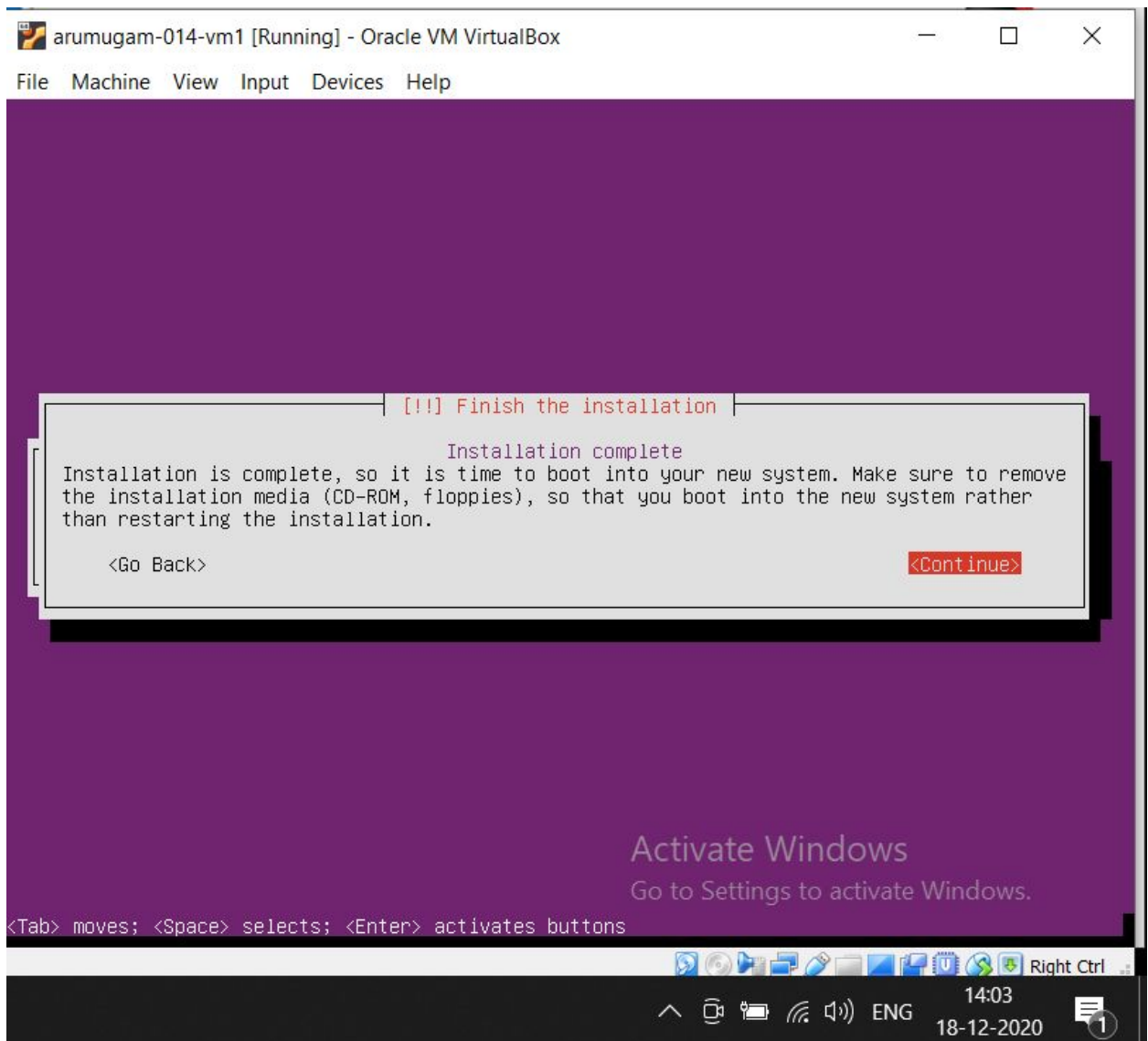
19. Confirm the partition options and select “yes” to continue installation.



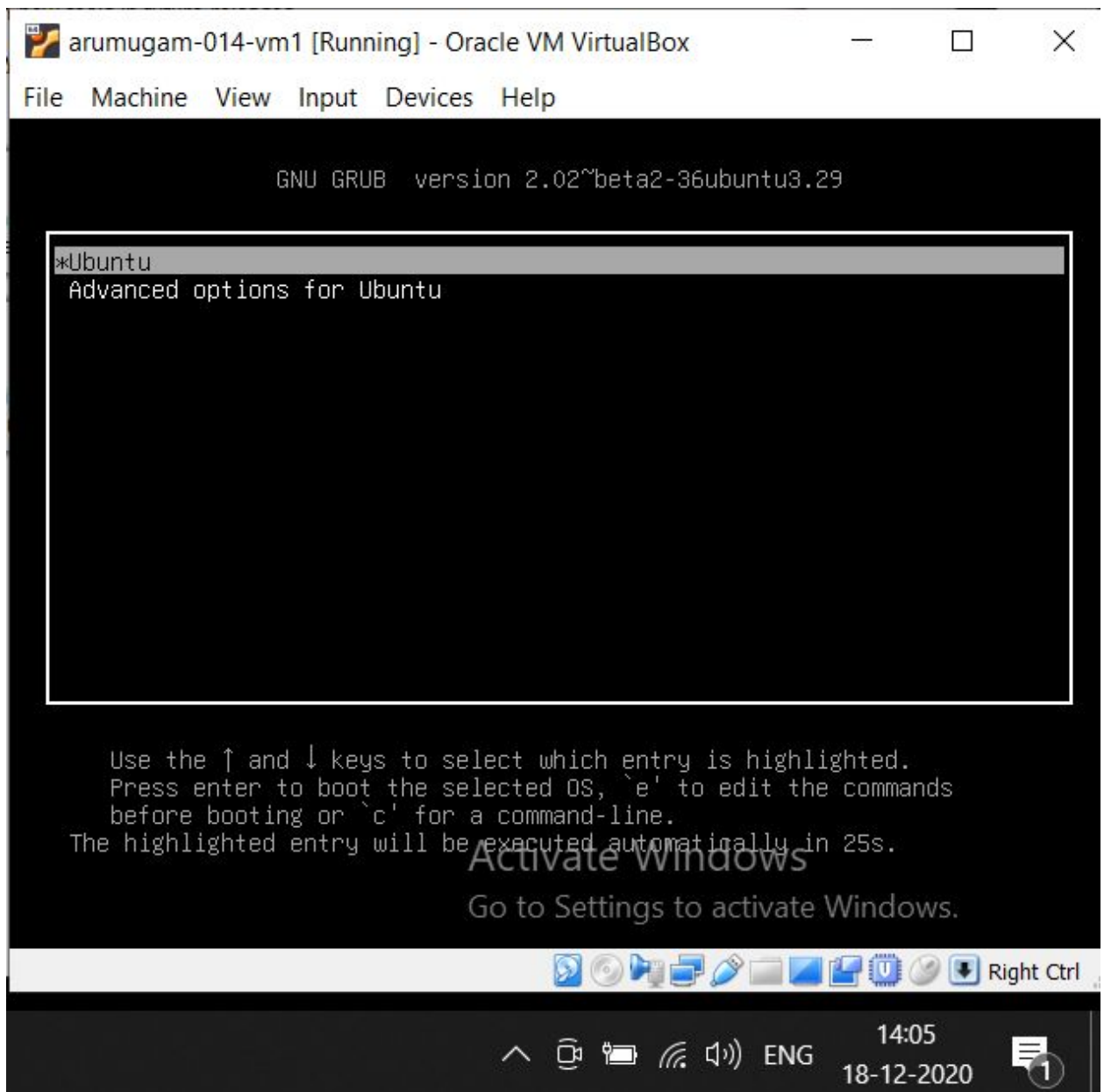
20. Select "OpenSSH server" option to also install openssh during installation of OS.



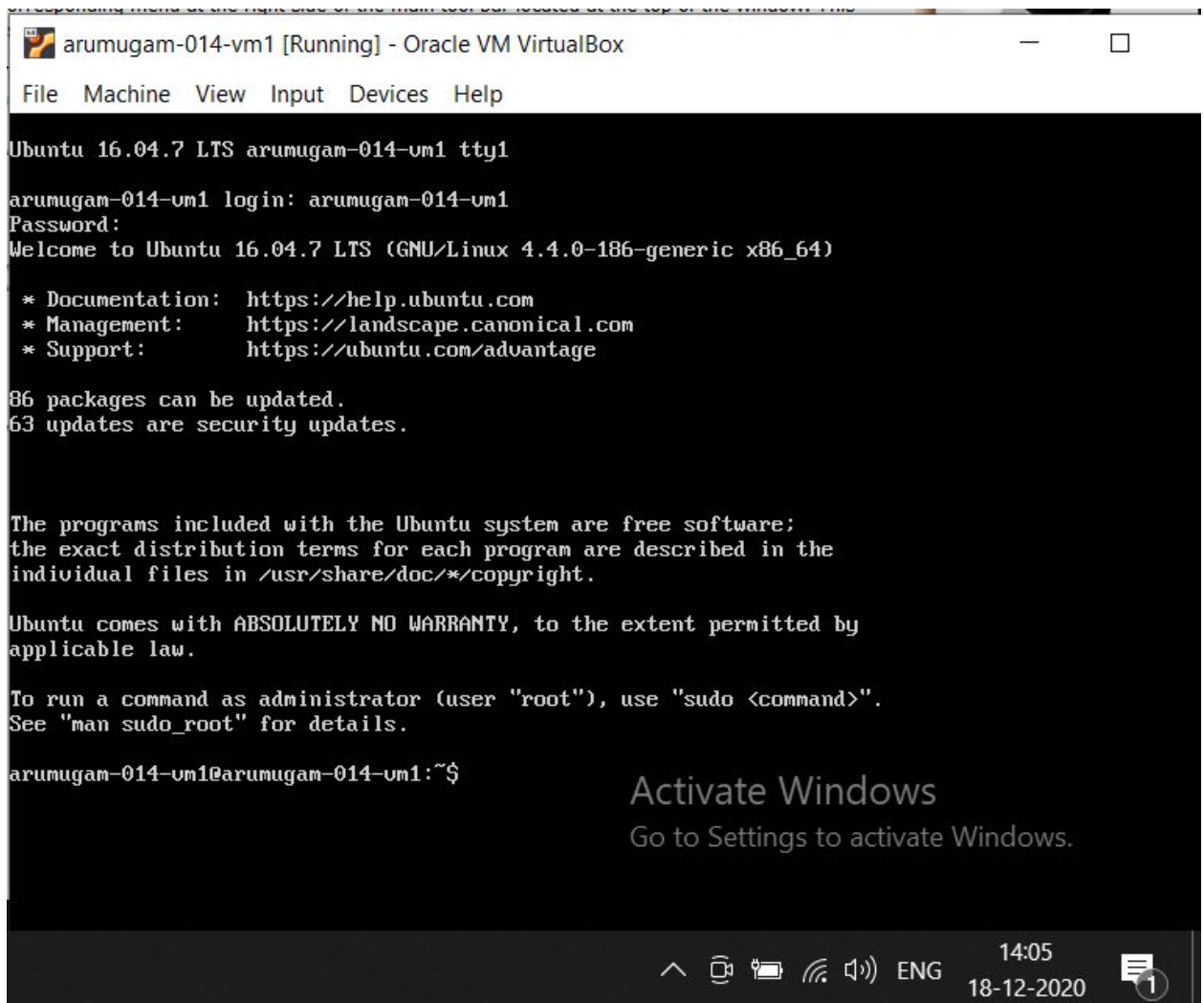
21. Installation is complete and reboot to login to the server.



22. Select "Ubuntu" in order to login to the ubuntu server.



23. Enter the username and password to login to your account in the server.



```
arumugam-014-vm1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Ubuntu 16.04.7 LTS arumugam-014-vm1 tty1
arumugam-014-vm1 login: arumugam-014-vm1
Password:
Welcome to Ubuntu 16.04.7 LTS (GNU/Linux 4.4.0-186-generic x86_64)

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

86 packages can be updated.
63 updates are security updates.

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.

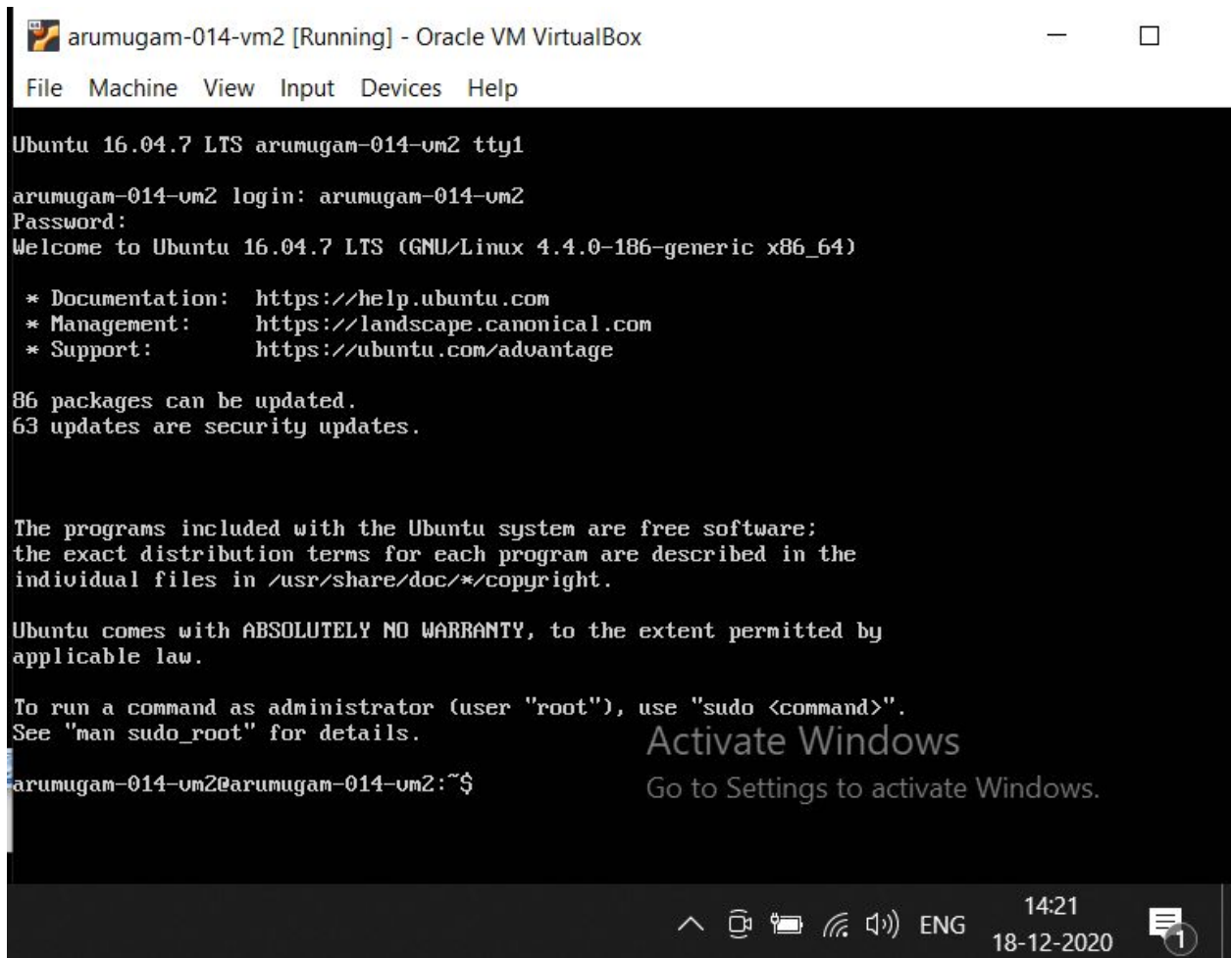
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

arumugam-014-vm1@arumugam-014-vm1:~$
```

Activate Windows  
Go to Settings to activate Windows.

14:05  
18-12-2020

24. Similarly, create second VM and install ubuntu server in it also and login to it.



```
arumugam-014-vm2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Ubuntu 16.04.7 LTS arumugam-014-vm2 tty1

arumugam-014-vm2 login: arumugam-014-vm2
Password:
Welcome to Ubuntu 16.04.7 LTS (GNU/Linux 4.4.0-186-generic x86_64)

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

86 packages can be updated.
63 updates are security updates.

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.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

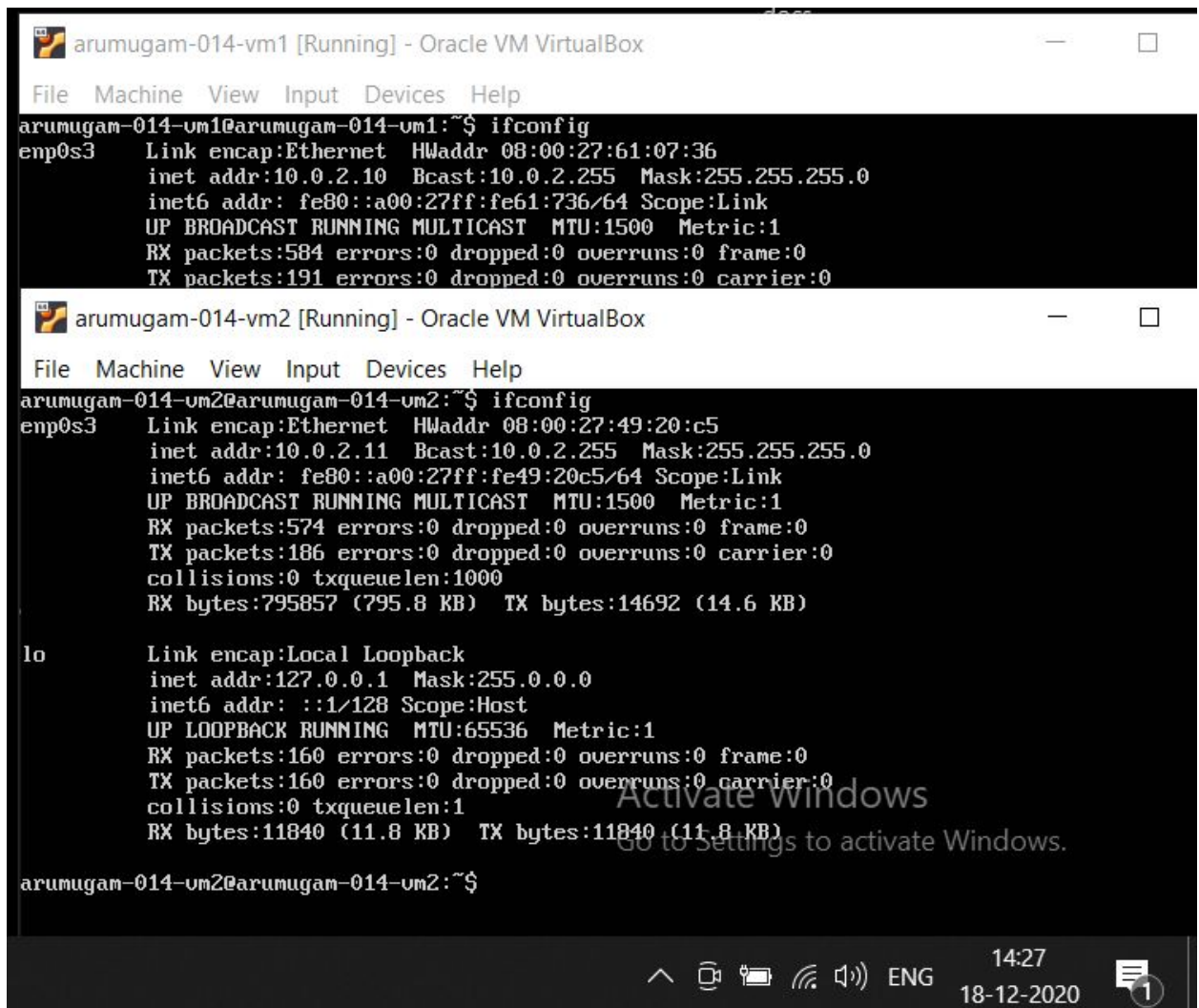
arumugam-014-vm2@arumugam-014-vm2:~$
```

Activate Windows  
Go to Settings to activate Windows.

14:21  
18-12-2020



25. Use the command “ifconfig” in order to display the IP addresses of the VM.



The image shows two overlapping windows from Oracle VM VirtualBox. The top window is titled 'arumugam-014-vm1 [Running] - Oracle VM VirtualBox' and the bottom window is titled 'arumugam-014-vm2 [Running] - Oracle VM VirtualBox'. Both windows have a menu bar with 'File', 'Machine', 'View', 'Input', 'Devices', and 'Help'. The terminal output in the top window shows the 'ifconfig' command being executed, displaying details for the 'enp0s3' interface, including its link type (Ethernet), hardware address (08:00:27:61:07:36), IP address (10.0.2.10), broadcast address (10.0.2.255), and mask (255.255.255.0). The bottom window shows the 'ifconfig' command being executed, displaying details for the 'enp0s3' interface, including its link type (Ethernet), hardware address (08:00:27:49:20:c5), IP address (10.0.2.11), broadcast address (10.0.2.255), and mask (255.255.255.0). Additionally, the 'lo' interface is shown with its link type (Local Loopback), IP address (127.0.0.1), and mask (255.0.0.0). A watermark 'Activate Windows' is visible in the bottom right corner of the terminal area.

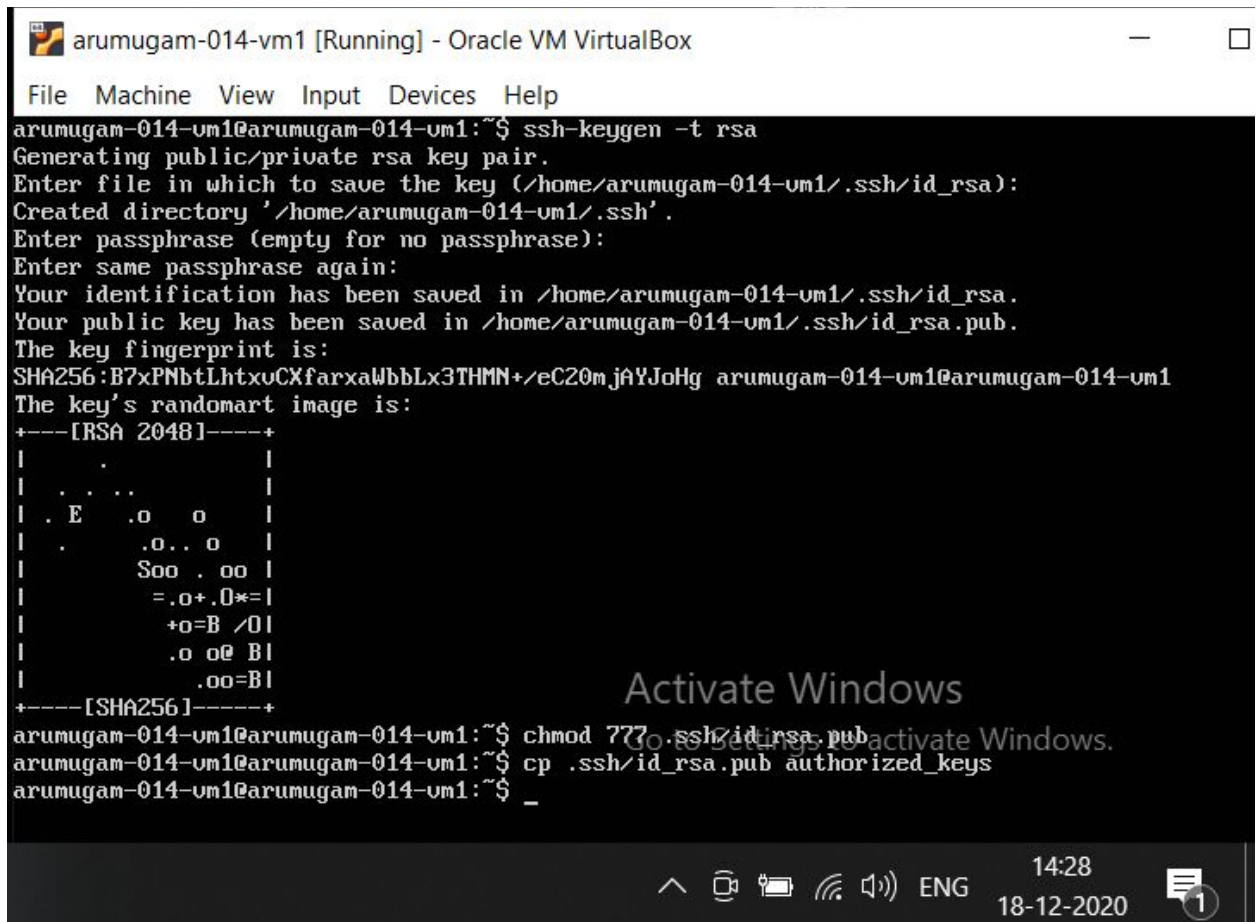
```
arumugam-014-vm1@arumugam-014-vm1:~$ ifconfig
enp0s3  Link encap:Ethernet  HWaddr 08:00:27:61:07:36
        inet addr:10.0.2.10  Bcast:10.0.2.255  Mask:255.255.255.0
        inet6 addr: fe80::a00:27ff:fe61:736/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:584 errors:0 dropped:0 overruns:0 frame:0
        TX packets:191 errors:0 dropped:0 overruns:0 carrier:0

arumugam-014-vm2@arumugam-014-vm2:~$ ifconfig
enp0s3  Link encap:Ethernet  HWaddr 08:00:27:49:20:c5
        inet addr:10.0.2.11  Bcast:10.0.2.255  Mask:255.255.255.0
        inet6 addr: fe80::a00:27ff:fe49:20c5/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:574 errors:0 dropped:0 overruns:0 frame:0
        TX packets:186 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:795857 (795.8 KB)  TX bytes:14692 (14.6 KB)

lo      Link encap:Local Loopback
        inet addr:127.0.0.1  Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
        UP LOOPBACK RUNNING  MTU:65536  Metric:1
        RX packets:160 errors:0 dropped:0 overruns:0 frame:0
        TX packets:160 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1
        RX bytes:11840 (11.8 KB)  TX bytes:11840 (11.8 KB)

arumugam-014-vm2@arumugam-014-vm2:~$
```

26. Use the command “ssh-keygen -t rsa” in order to create a key pair and change the permission of the key and copy the key to authorized\_keys

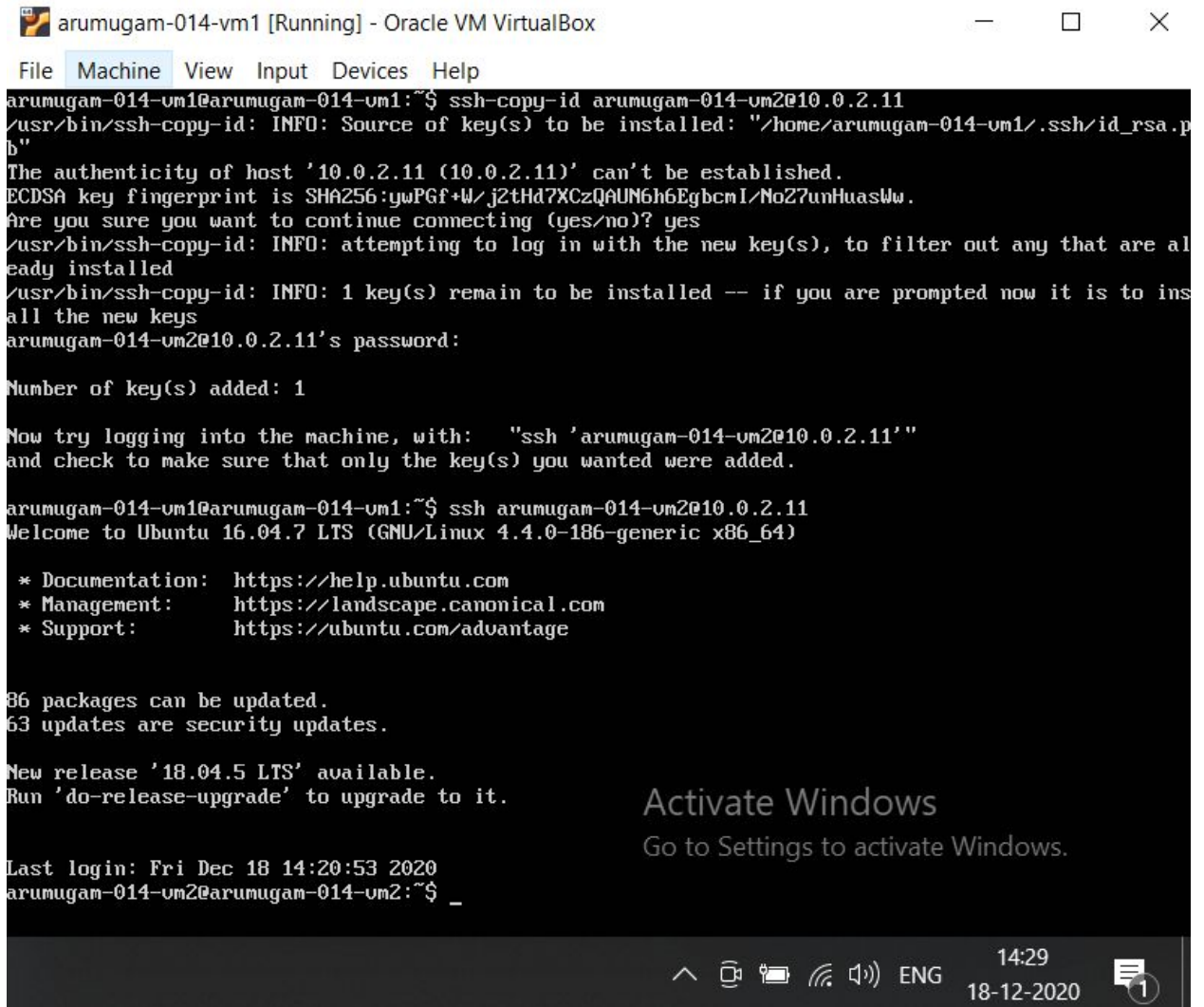


```
arumugam-014-vm1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
arumugam-014-vm1@arumugam-014-vm1:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/arumugam-014-vm1/.ssh/id_rsa):
Created directory '/home/arumugam-014-vm1/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/arumugam-014-vm1/.ssh/id_rsa.
Your public key has been saved in /home/arumugam-014-vm1/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:B7xPNbtLhtxuCXfarxaWbbLx3THMN+/eC20mjAYJoHg arumugam-014-vm1@arumugam-014-vm1
The key's randomart image is:
+---[RSA 2048]-----+
|      .               |
|      . . . .        |
|    . E  .o  o        |
|      .  .o.. o       |
|          Soo . oo    |
|          =.o+.O*=    |
|          +o=B /O|    |
|          .o oo B|    |
|          .oo=B|     |
+-----[SHA256]-----+
arumugam-014-vm1@arumugam-014-vm1:~$ chmod 777 .ssh/id_rsa.pub
arumugam-014-vm1@arumugam-014-vm1:~$ cp .ssh/id_rsa.pub authorized_keys
arumugam-014-vm1@arumugam-014-vm1:~$ _
```

Activate Windows  
Go to Settings to activate Windows.

14:28  
18-12-2020

27. Use the command “ssh-copy-id username@IP\_address” to copy the key pair to the intended VM



```
arumugam-014-vm1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
arumugam-014-vm1@arumugam-014-vm1:~$ ssh-copy-id arumugam-014-vm2@10.0.2.11
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/arumugam-014-vm1/.ssh/id_rsa.p
b"
The authenticity of host '10.0.2.11 (10.0.2.11)' can't be established.
ECDSA key fingerprint is SHA256:gwPGf+W/j2tHd7XCzQAUN6h6Egbcml/NoZ7unHuasWw.
Are you sure you want to continue connecting (yes/no)? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are al
eady installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to ins
all the new keys
arumugam-014-vm2@10.0.2.11's password:
Number of key(s) added: 1

Now try logging into the machine, with:  "ssh 'arumugam-014-vm2@10.0.2.11'"
and check to make sure that only the key(s) you wanted were added.

arumugam-014-vm1@arumugam-014-vm1:~$ ssh arumugam-014-vm2@10.0.2.11
Welcome to Ubuntu 16.04.7 LTS (GNU/Linux 4.4.0-186-generic x86_64)

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

86 packages can be updated.
63 updates are security updates.

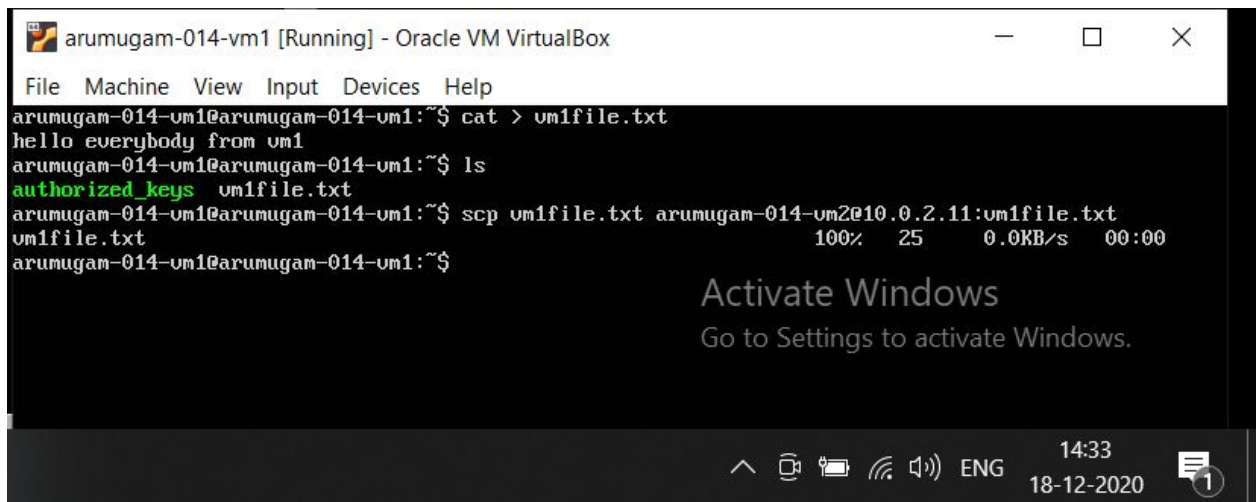
New release '18.04.5 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Fri Dec 18 14:20:53 2020
arumugam-014-vm2@arumugam-014-vm2:~$ _
```

Activate Windows  
Go to Settings to activate Windows.

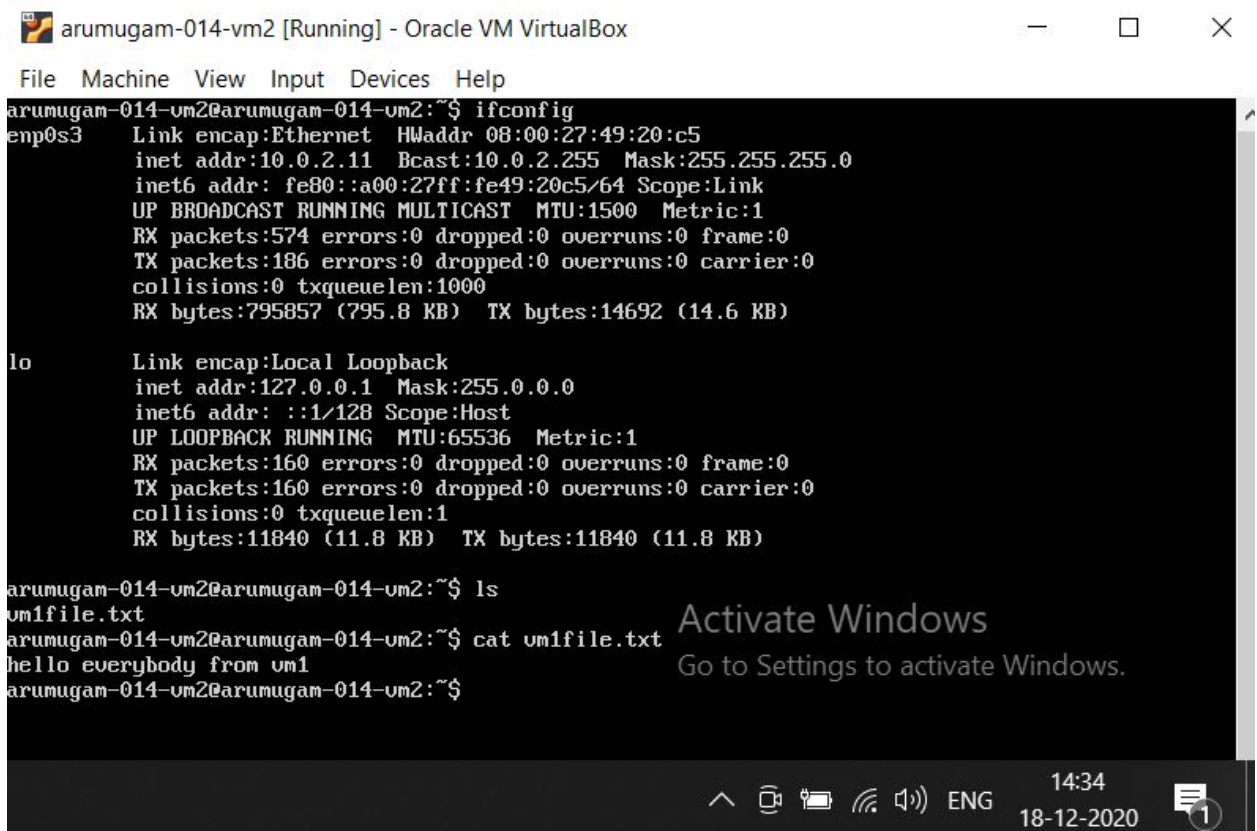
14:29  
18-12-2020

28. Create a file in VM1 and transfer the file to VM2 using the command “scp filename username@IP\_address:filename” in this case “scp vm1file.txt arumugam-014-vm2@10.0.2.11:vm1file.txt”



```
arumugam-014-vm1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
arumugam-014-vm1@arumugam-014-vm1:~$ cat > vm1file.txt
hello everybody from vm1
arumugam-014-vm1@arumugam-014-vm1:~$ ls
authorized_keys  vm1file.txt
arumugam-014-vm1@arumugam-014-vm1:~$ scp vm1file.txt arumugam-014-vm2@10.0.2.11:vm1file.txt
vm1file.txt                                           100% 25   0.0KB/s   00:00
arumugam-014-vm1@arumugam-014-vm1:~$
```

29. Use the command “ls” to check if the file is received. The file is successfully transferred to home directory of VM2 from VM1.



```
arumugam-014-vm2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
arumugam-014-vm2@arumugam-014-vm2:~$ ifconfig
enp0s3  Link encap:Ethernet  HWaddr 08:00:27:49:20:c5
        inet addr:10.0.2.11  Bcast:10.0.2.255  Mask:255.255.255.0
        inet6 addr: fe80::a00:27ff:fe49:20c5/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:574 errors:0 dropped:0 overruns:0 frame:0
        TX packets:186 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:795857 (795.8 KB)  TX bytes:14692 (14.6 KB)

lo      Link encap:Local Loopback
        inet addr:127.0.0.1  Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
        UP LOOPBACK RUNNING  MTU:65536  Metric:1
        RX packets:160 errors:0 dropped:0 overruns:0 frame:0
        TX packets:160 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1
        RX bytes:11840 (11.8 KB)  TX bytes:11840 (11.8 KB)

arumugam-014-vm2@arumugam-014-vm2:~$ ls
vm1file.txt
arumugam-014-vm2@arumugam-014-vm2:~$ cat vm1file.txt
hello everybody from vm1
arumugam-014-vm2@arumugam-014-vm2:~$
```

**Result:** A cluster of 2 VMs is created, both with Ubuntu-16.0.4 server edition as Operating system and then a file is transferred from VM1 to VM2 successfully.