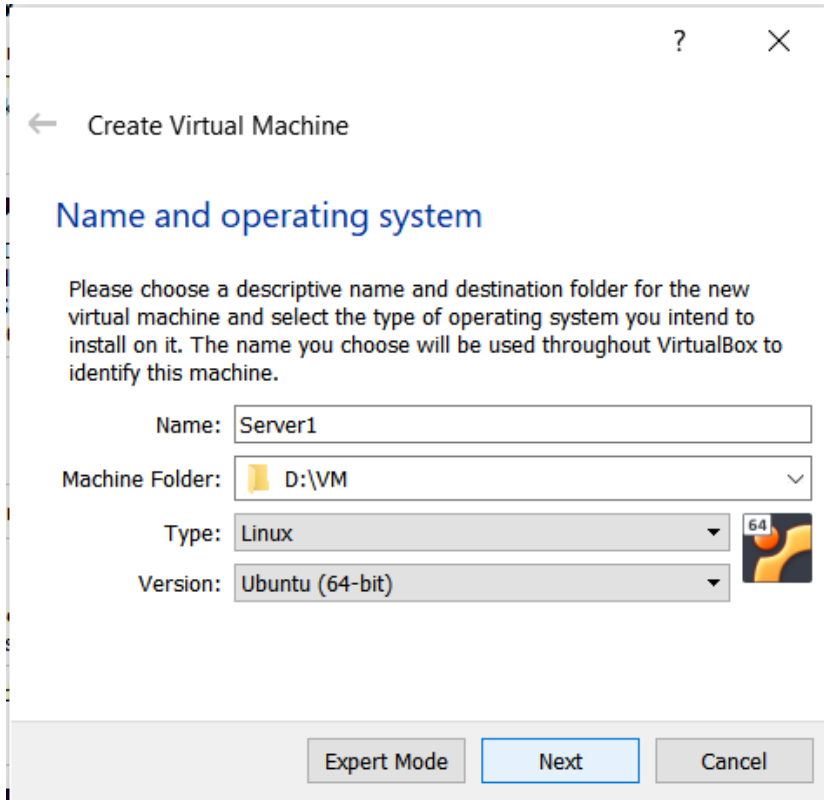


## Ex.No.3

## Remote Login into a VM

### 1. Create two VMs and install Ubuntu 16.04 server

Creation of Server1:



The screenshot shows the 'Create Virtual Machine' wizard in Oracle VM VirtualBox. The title bar includes a question mark and a close button. The main heading is 'Create Virtual Machine' with a back arrow. Below this is the section 'Name and operating system'. A text box explains: 'Please choose a descriptive name and destination folder for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.' The form contains four fields: 'Name' with the value 'Server1', 'Machine Folder' with a folder icon and the path 'D:\VM', 'Type' with a dropdown menu set to 'Linux', and 'Version' with a dropdown menu set to 'Ubuntu (64-bit)'. To the right of the 'Type' and 'Version' dropdowns is a small icon of a 64-bit operating system. At the bottom, there are three buttons: 'Expert Mode', 'Next' (highlighted with a blue border), and 'Cancel'.

← Create Virtual Machine

### Name and operating system

Please choose a descriptive name and destination folder for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.

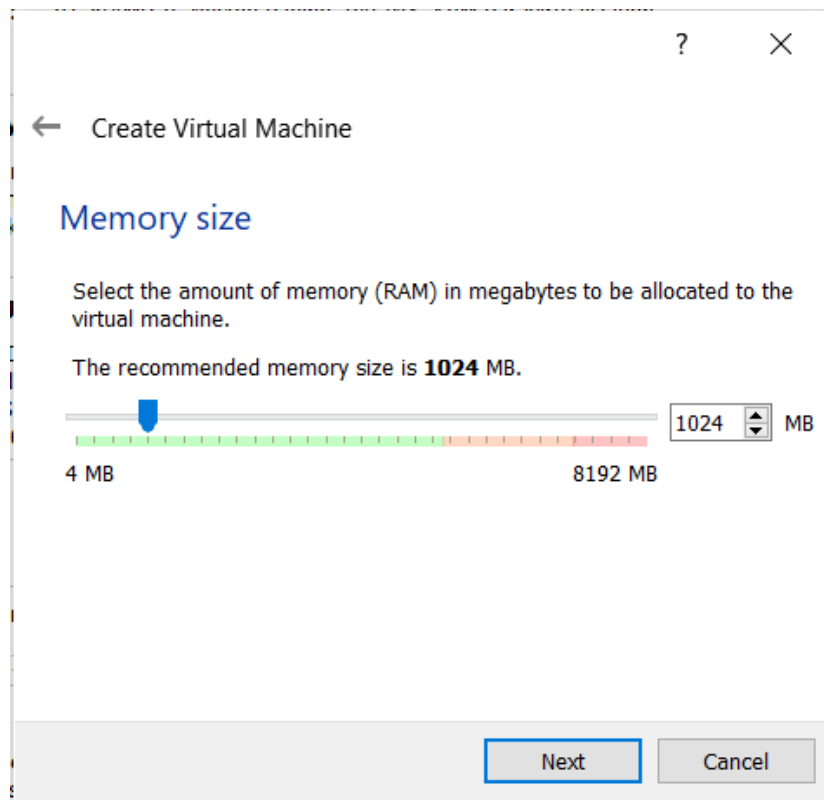
Name:

Machine Folder:

Type:

Version:

Expert Mode Next Cancel



The screenshot shows the second step of the 'Create Virtual Machine' wizard, titled 'Memory size'. It includes the same title bar and back arrow. The section heading is 'Memory size'. A text box explains: 'Select the amount of memory (RAM) in megabytes to be allocated to the virtual machine.' Below this, it states: 'The recommended memory size is 1024 MB.' A horizontal slider bar is shown with a blue handle. The bar has a green segment on the left and a red segment on the right. The left end is labeled '4 MB' and the right end is labeled '8192 MB'. To the right of the slider is a numeric input field containing '1024' and a unit 'MB'. At the bottom, there are two buttons: 'Next' (highlighted with a blue border) and 'Cancel'.

← Create Virtual Machine

### Memory size

Select the amount of memory (RAM) in megabytes to be allocated to the virtual machine.

The recommended memory size is 1024 MB.

4 MB 8192 MB

1024 MB

Next Cancel

?

×

←

Create Virtual Machine

### Hard disk

If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select one from the list or from another location using the folder icon.

If you need a more complex storage set-up you can skip this step and make the changes to the machine settings once the machine is created.

The recommended size of the hard disk is **8.00 GB**.


☐ Do not add a virtual hard disk

☒ Create a virtual hard disk now

☐ Use an existing virtual hard disk file

VM1.vdi (Normal, 10.00 GB)

▼



Create

Cancel

?

×

←

Create Virtual Hard Disk

### Hard disk file type

Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.

☒ VDI (VirtualBox Disk Image)

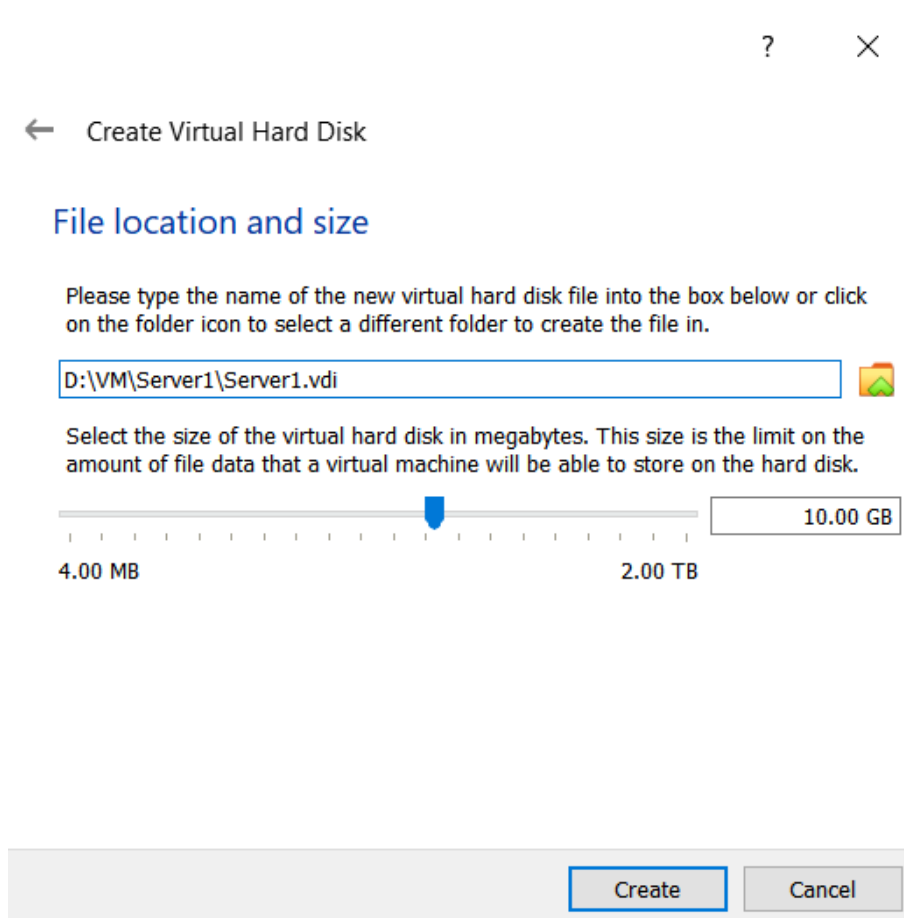
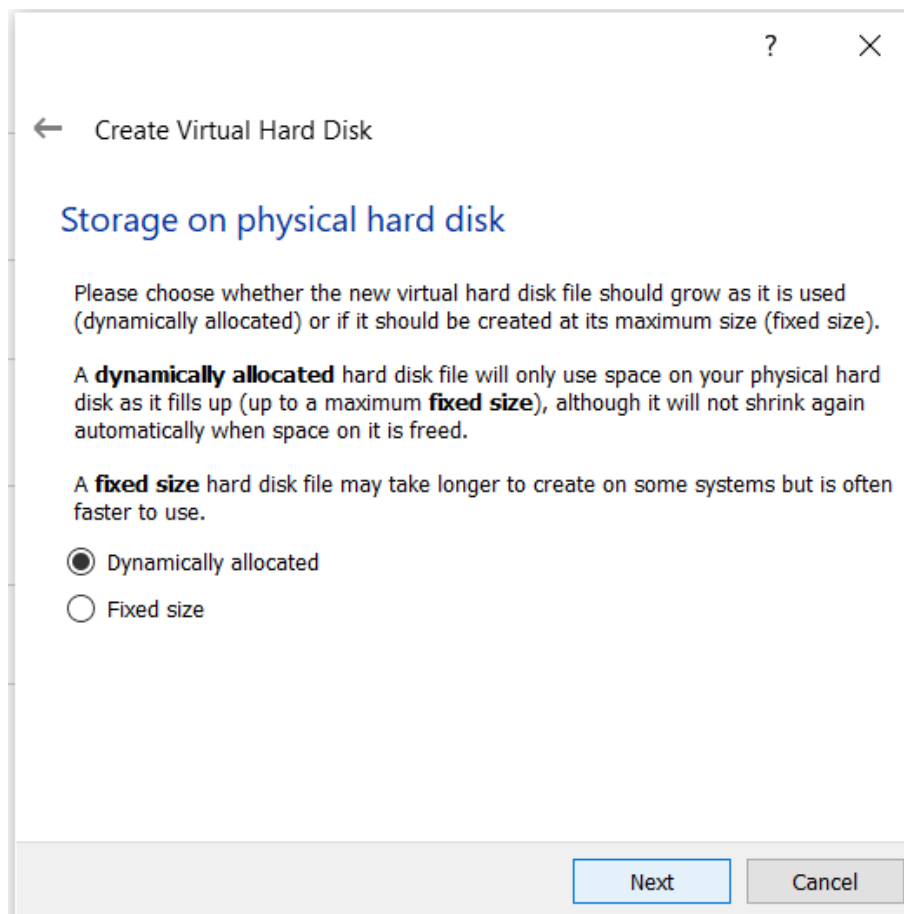
☐ VHD (Virtual Hard Disk)

☐ VMDK (Virtual Machine Disk)

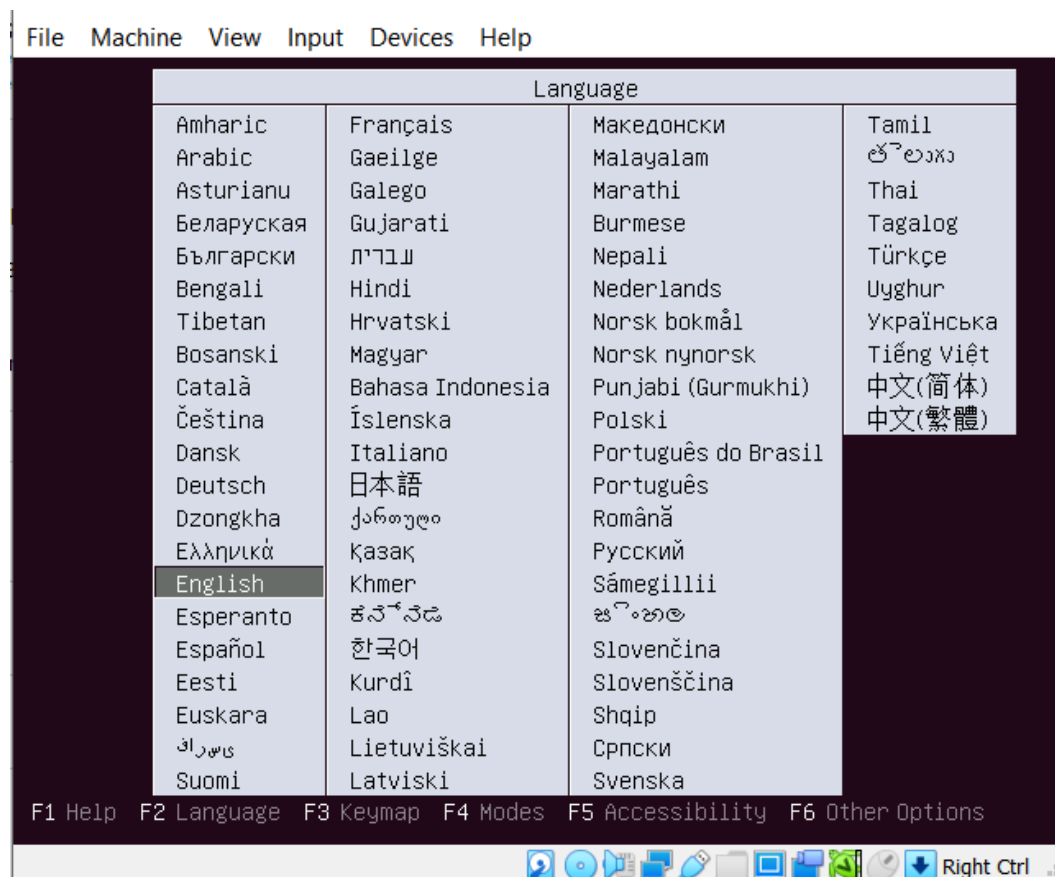
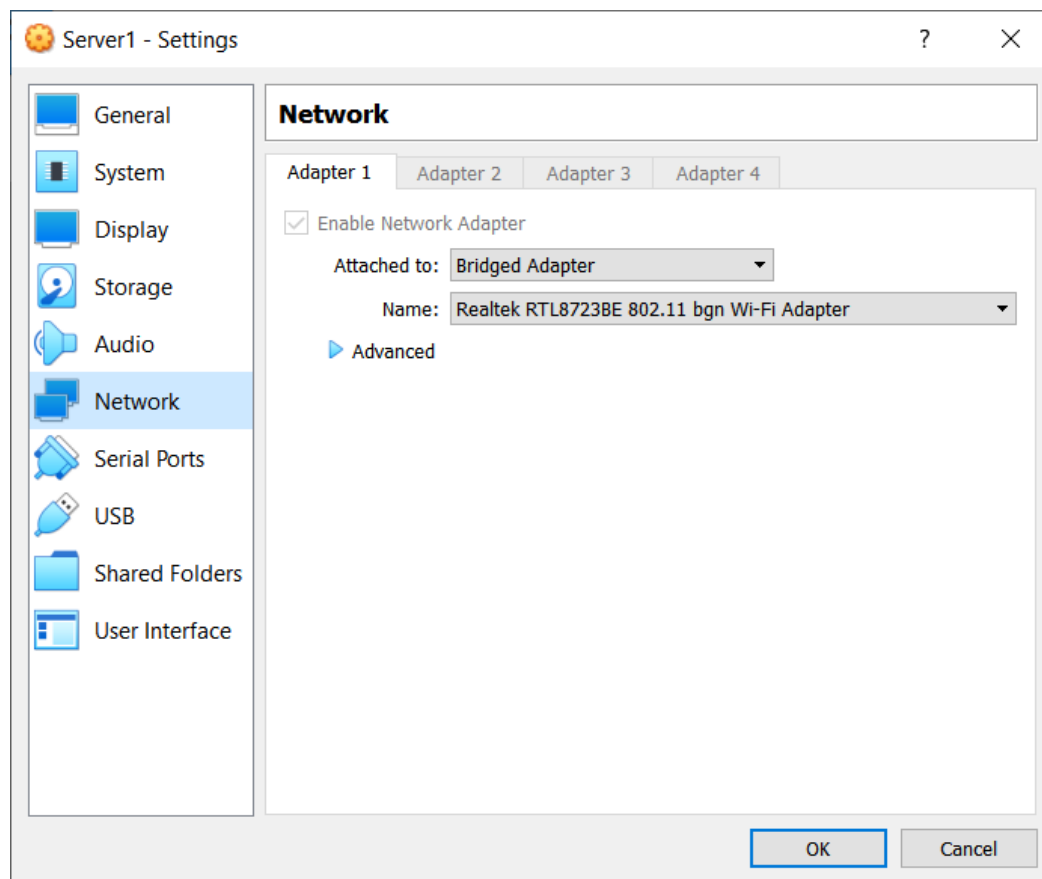
Expert Mode

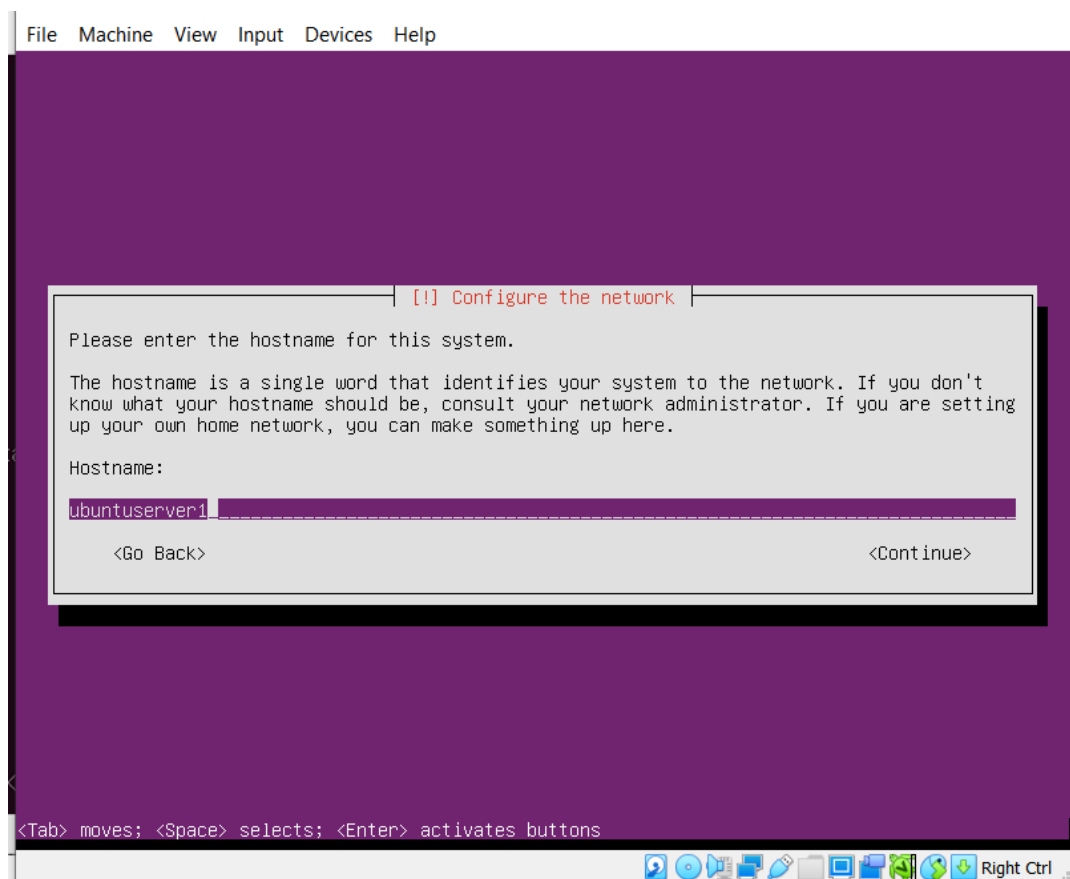
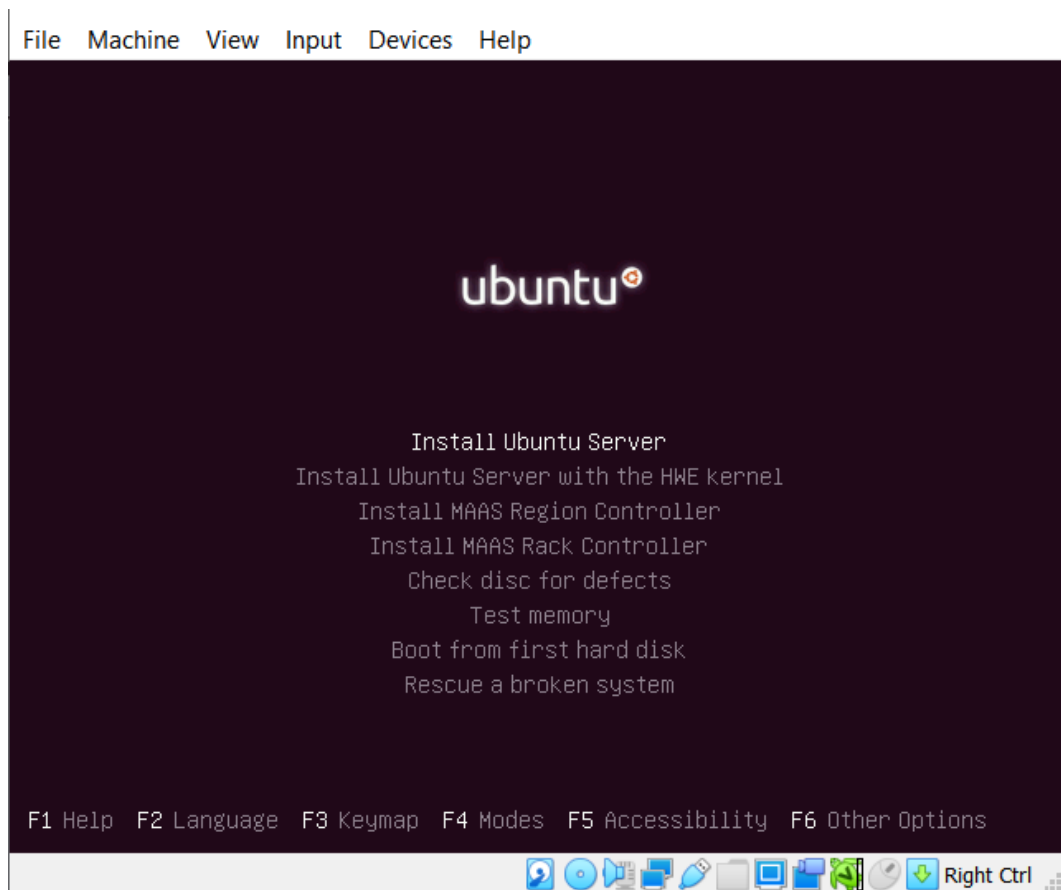
Next

Cancel



## Change the network settings to Bridged adapter





[[!]] Set up users and passwords

Select a username for the new account. Your first name is a reasonable choice. The username should start with a lower-case letter, which can be followed by any combination of numbers and more lower-case letters.

Username for your account:

vaishali1

<Go Back> <Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



[[!]] Set up users and passwords

A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.

Choose a password for the new user:

\*\*\*\*\*

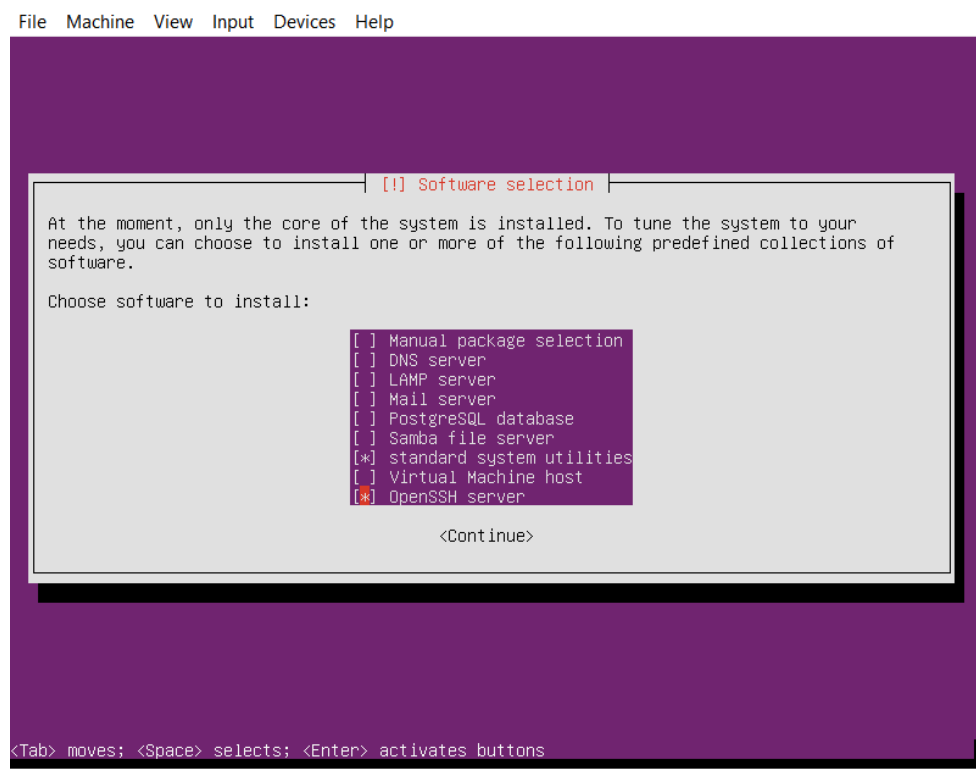
[ ] Show Password in Clear

<Go Back> <Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



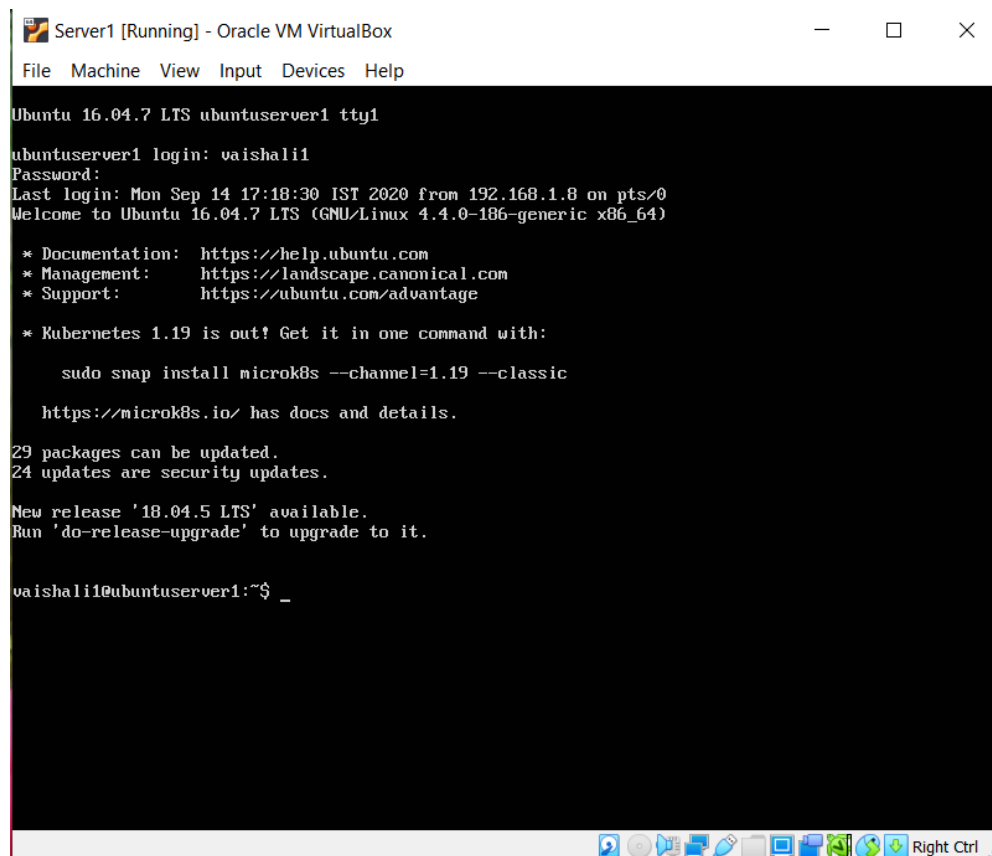
## Installation of Open SSH



## VM1

**Hostname: ubuntuserver1**

**Username: vaishali1**

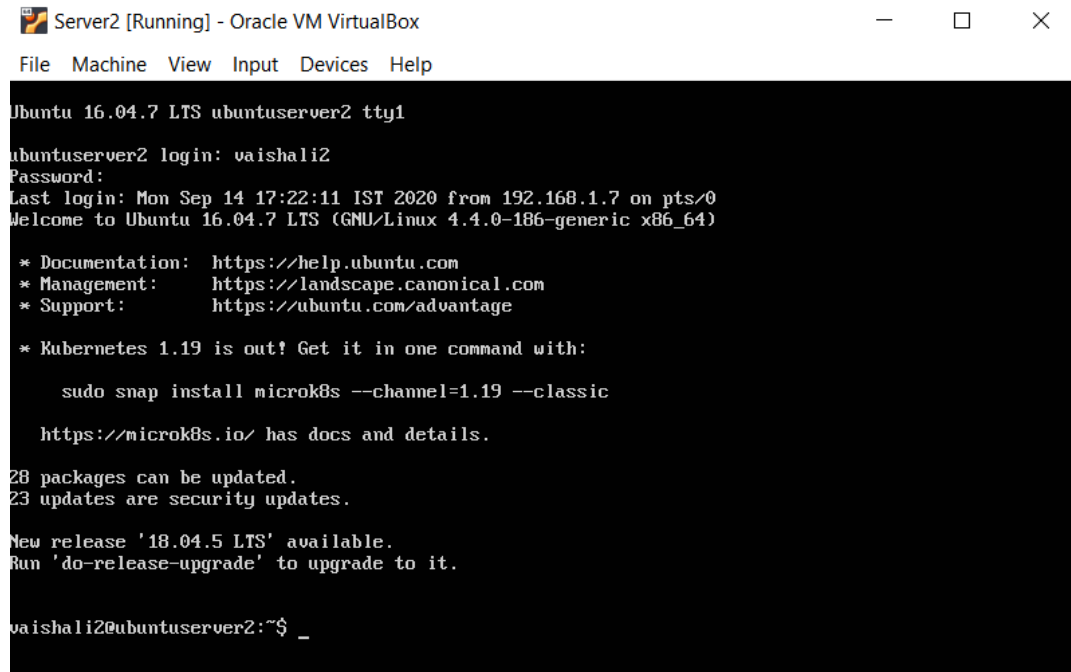


Similarly another VM is created and Ubuntu 16.04 server is installed.

## VM2

**Hostname: ubuntuserver2**

**Username: vaishali2**



```
Server2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Ubuntu 16.04.7 LTS ubuntuserver2 tty1
ubuntuserver2 login: vaishali2
Password:
Last login: Mon Sep 14 17:22:11 IST 2020 from 192.168.1.7 on pts/0
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

 * Kubernetes 1.19 is out! Get it in one command with:

   sudo snap install microk8s --channel=1.19 --classic

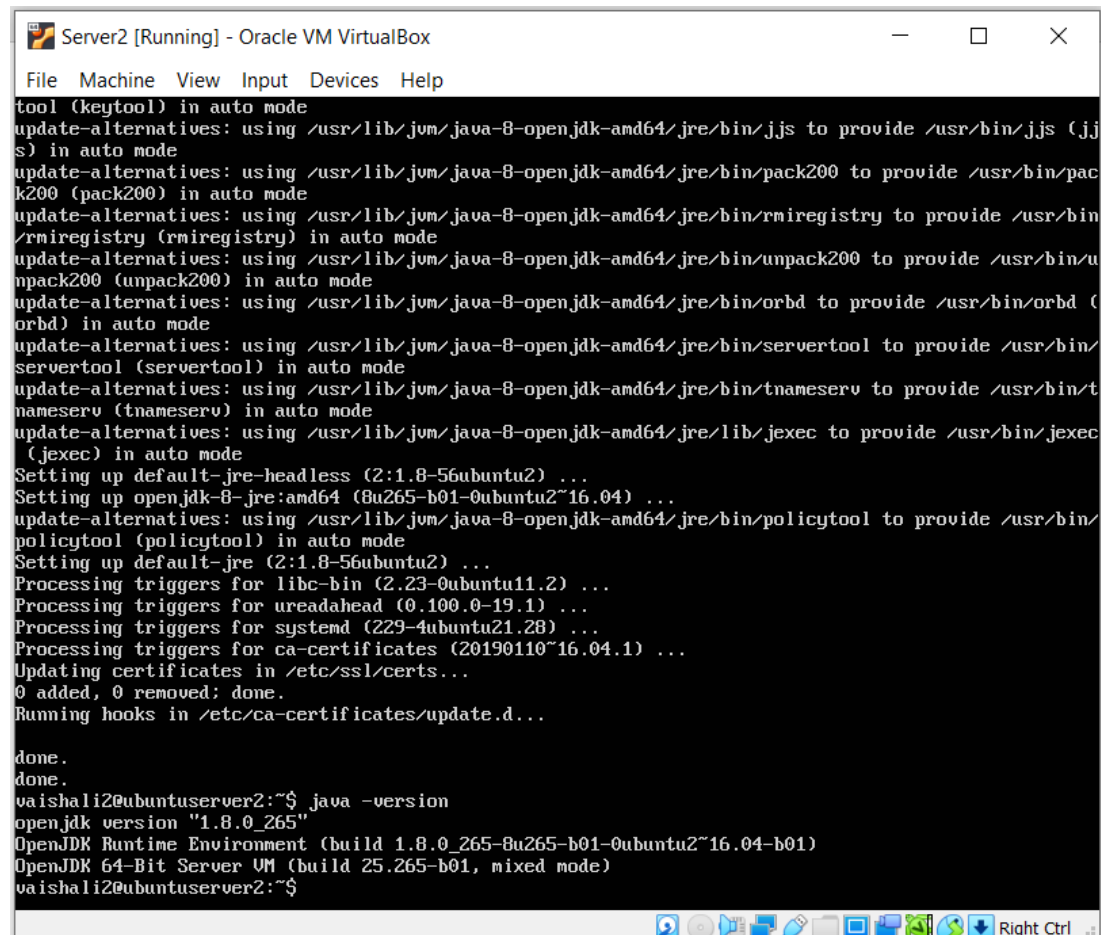
   https://microk8s.io/ has docs and details.

28 packages can be updated.
23 updates are security updates.

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

vaishali2@ubuntuserver2:~$ _
```

## JDK installation in VM2



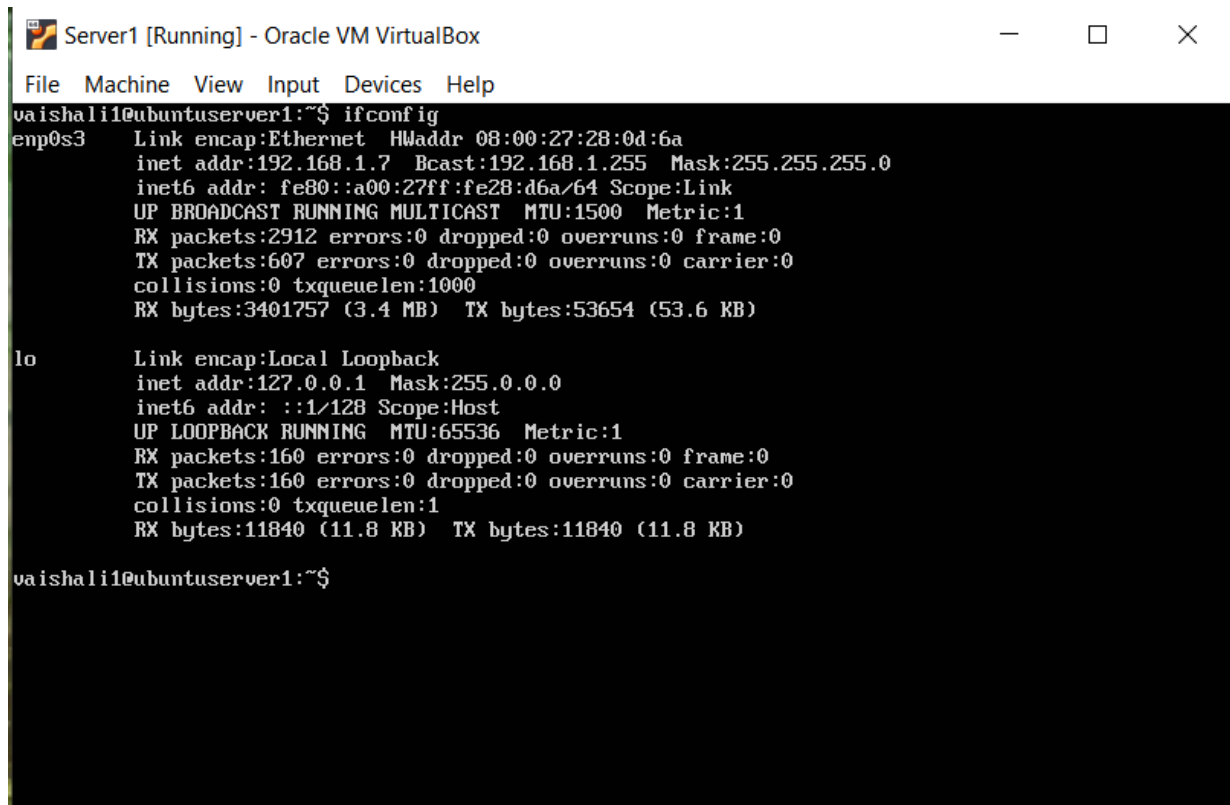
```
Server2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

tool (keytool) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/jjs to provide /usr/bin/jjs (jjs) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/pack200 to provide /usr/bin/pack200 (pack200) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/rmiregistry to provide /usr/bin/rmiregistry (rmiregistry) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/unpack200 to provide /usr/bin/unpack200 (unpack200) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/orbd to provide /usr/bin/orbd (orbd) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/servertool to provide /usr/bin/servertool (servertool) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/tnameserv to provide /usr/bin/tnameserv (tnameserv) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/lib/jexec to provide /usr/bin/jexec (jexec) in auto mode
Setting up default-jre-headless (2:1.8-56ubuntu2) ...
Setting up openjdk-8-jre:amd64 (8u265-b01-0ubuntu2~16.04) ...
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/policytool to provide /usr/bin/policytool (policytool) in auto mode
Setting up default-jre (2:1.8-56ubuntu2) ...
Processing triggers for libc-bin (2.23-0ubuntu11.2) ...
Processing triggers for ureadahead (0.100.0-19.1) ...
Processing triggers for systemd (229-4ubuntu21.28) ...
Processing triggers for ca-certificates (20190110~16.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
done.
vaishali2@ubuntuserver2:~$ java -version
openjdk version "1.8.0_265"
OpenJDK Runtime Environment (build 1.8.0_265-8u265-b01-0ubuntu2~16.04-b01)
OpenJDK 64-Bit Server VM (build 25.265-b01, mixed mode)
vaishali2@ubuntuserver2:~$
```



## ifconfig in VM1

IP address of VM1 is 192.168.1.7



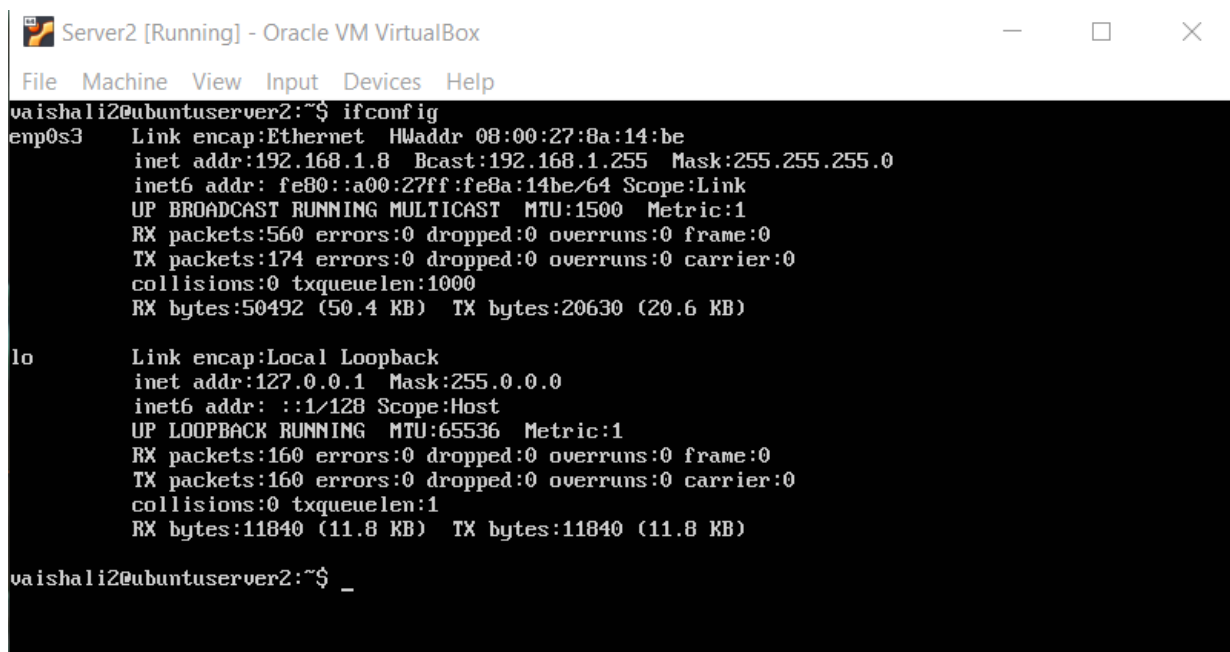
```
Server1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
vaishali1@ubuntuserver1:~$ ifconfig
enp0s3  Link encap:Ethernet  HWaddr 08:00:27:28:0d:6a
        inet addr:192.168.1.7  Bcast:192.168.1.255  Mask:255.255.255.0
        inet6 addr: fe80::a00:27ff:fe28:d6a/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:2912 errors:0 dropped:0 overruns:0 frame:0
        TX packets:607 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:3401757 (3.4 MB)  TX bytes:53654 (53.6 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)

vaishali1@ubuntuserver1:~$
```

## ifconfig in VM2

IP address of VM1 is 192.168.1.8



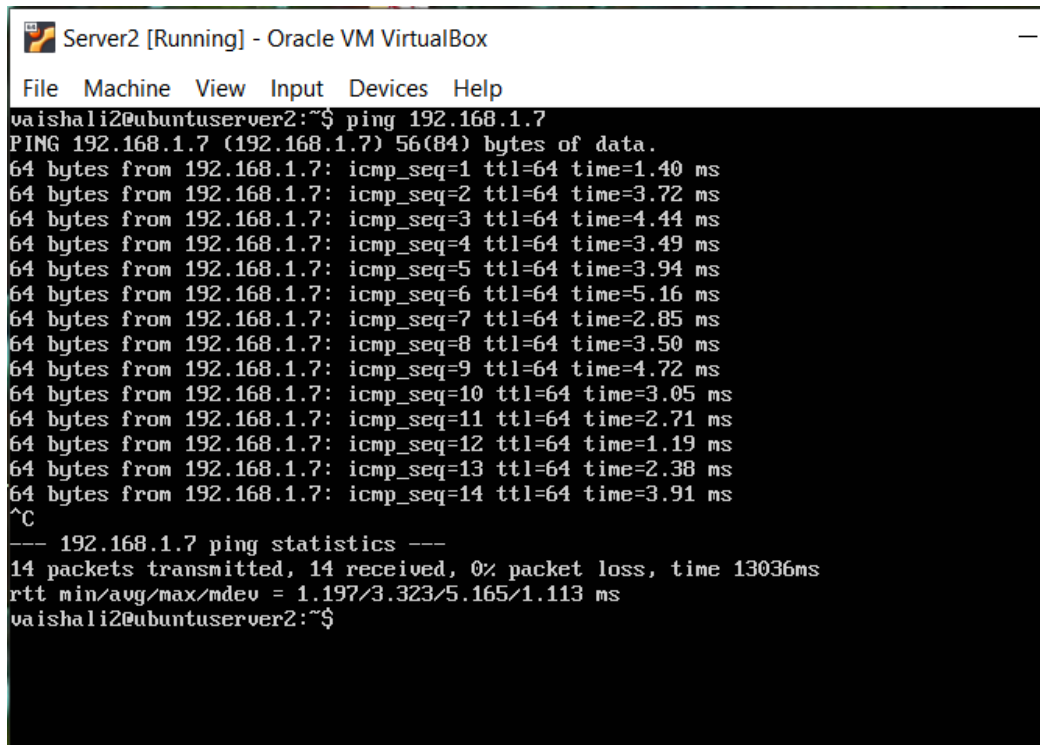
```
Server2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
vaishali2@ubuntuserver2:~$ ifconfig
enp0s3  Link encap:Ethernet  HWaddr 08:00:27:8a:14:be
        inet addr:192.168.1.8  Bcast:192.168.1.255  Mask:255.255.255.0
        inet6 addr: fe80::a00:27ff:fe8a:14be/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:560 errors:0 dropped:0 overruns:0 frame:0
        TX packets:174 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:50492 (50.4 KB)  TX bytes:20630 (20.6 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)

vaishali2@ubuntuserver2:~$ _
```

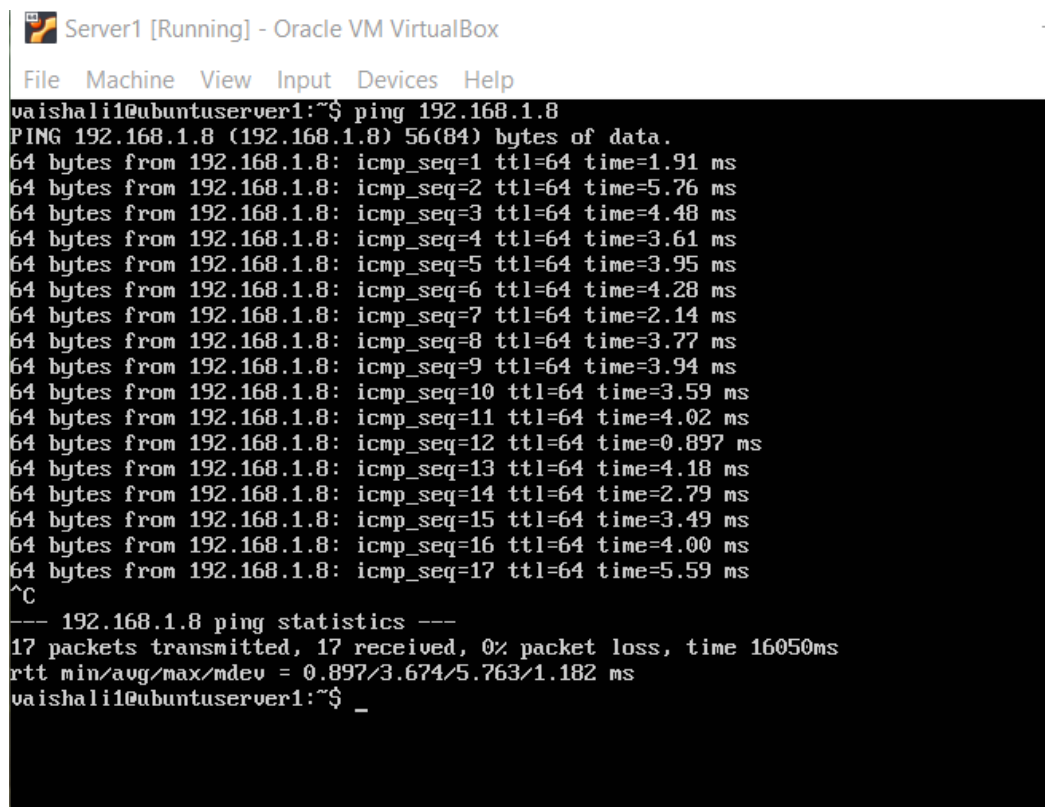
## 2. Remote login with password

- Ping VM1 from VM2



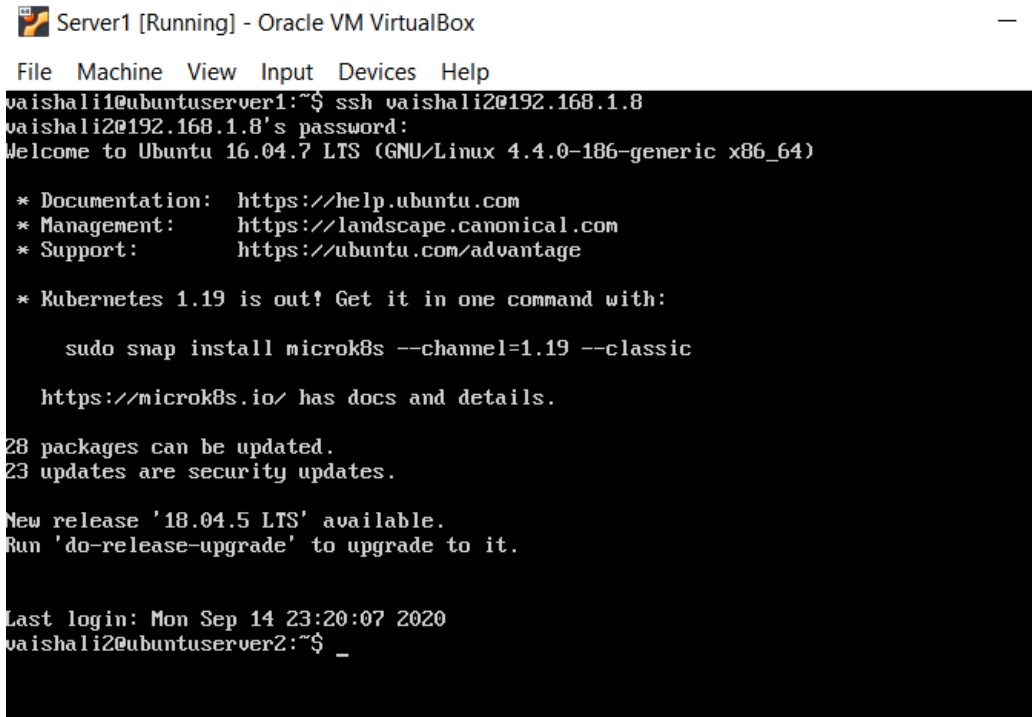
```
Server2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
vaishali2@ubuntu:server2:~$ ping 192.168.1.7
PING 192.168.1.7 (192.168.1.7) 56(84) bytes of data.
64 bytes from 192.168.1.7: icmp_seq=1 ttl=64 time=1.40 ms
64 bytes from 192.168.1.7: icmp_seq=2 ttl=64 time=3.72 ms
64 bytes from 192.168.1.7: icmp_seq=3 ttl=64 time=4.44 ms
64 bytes from 192.168.1.7: icmp_seq=4 ttl=64 time=3.49 ms
64 bytes from 192.168.1.7: icmp_seq=5 ttl=64 time=3.94 ms
64 bytes from 192.168.1.7: icmp_seq=6 ttl=64 time=5.16 ms
64 bytes from 192.168.1.7: icmp_seq=7 ttl=64 time=2.85 ms
64 bytes from 192.168.1.7: icmp_seq=8 ttl=64 time=3.50 ms
64 bytes from 192.168.1.7: icmp_seq=9 ttl=64 time=4.72 ms
64 bytes from 192.168.1.7: icmp_seq=10 ttl=64 time=3.05 ms
64 bytes from 192.168.1.7: icmp_seq=11 ttl=64 time=2.71 ms
64 bytes from 192.168.1.7: icmp_seq=12 ttl=64 time=1.19 ms
64 bytes from 192.168.1.7: icmp_seq=13 ttl=64 time=2.38 ms
64 bytes from 192.168.1.7: icmp_seq=14 ttl=64 time=3.91 ms
^C
--- 192.168.1.7 ping statistics ---
14 packets transmitted, 14 received, 0% packet loss, time 13036ms
rtt min/avg/max/mdev = 1.197/3.323/5.165/1.113 ms
vaishali2@ubuntu:server2:~$
```

- Ping VM2 from VM1



```
Server1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
vaishali1@ubuntu:server1:~$ ping 192.168.1.8
PING 192.168.1.8 (192.168.1.8) 56(84) bytes of data.
64 bytes from 192.168.1.8: icmp_seq=1 ttl=64 time=1.91 ms
64 bytes from 192.168.1.8: icmp_seq=2 ttl=64 time=5.76 ms
64 bytes from 192.168.1.8: icmp_seq=3 ttl=64 time=4.48 ms
64 bytes from 192.168.1.8: icmp_seq=4 ttl=64 time=3.61 ms
64 bytes from 192.168.1.8: icmp_seq=5 ttl=64 time=3.95 ms
64 bytes from 192.168.1.8: icmp_seq=6 ttl=64 time=4.28 ms
64 bytes from 192.168.1.8: icmp_seq=7 ttl=64 time=2.14 ms
64 bytes from 192.168.1.8: icmp_seq=8 ttl=64 time=3.77 ms
64 bytes from 192.168.1.8: icmp_seq=9 ttl=64 time=3.94 ms
64 bytes from 192.168.1.8: icmp_seq=10 ttl=64 time=3.59 ms
64 bytes from 192.168.1.8: icmp_seq=11 ttl=64 time=4.02 ms
64 bytes from 192.168.1.8: icmp_seq=12 ttl=64 time=0.897 ms
64 bytes from 192.168.1.8: icmp_seq=13 ttl=64 time=4.18 ms
64 bytes from 192.168.1.8: icmp_seq=14 ttl=64 time=2.79 ms
64 bytes from 192.168.1.8: icmp_seq=15 ttl=64 time=3.49 ms
64 bytes from 192.168.1.8: icmp_seq=16 ttl=64 time=4.00 ms
64 bytes from 192.168.1.8: icmp_seq=17 ttl=64 time=5.59 ms
^C
--- 192.168.1.8 ping statistics ---
17 packets transmitted, 17 received, 0% packet loss, time 16050ms
rtt min/avg/max/mdev = 0.897/3.674/5.763/1.182 ms
vaishali1@ubuntu:server1:~$ _
```

- Remote login to VM2 from VM1 using SSH (with password)



Server1 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

```
vaishali1@ubuntuserver1:~$ ssh vaishali2@192.168.1.8
vaishali2@192.168.1.8's 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

 * Kubernetes 1.19 is out! Get it in one command with:

   sudo snap install microk8s --channel=1.19 --classic

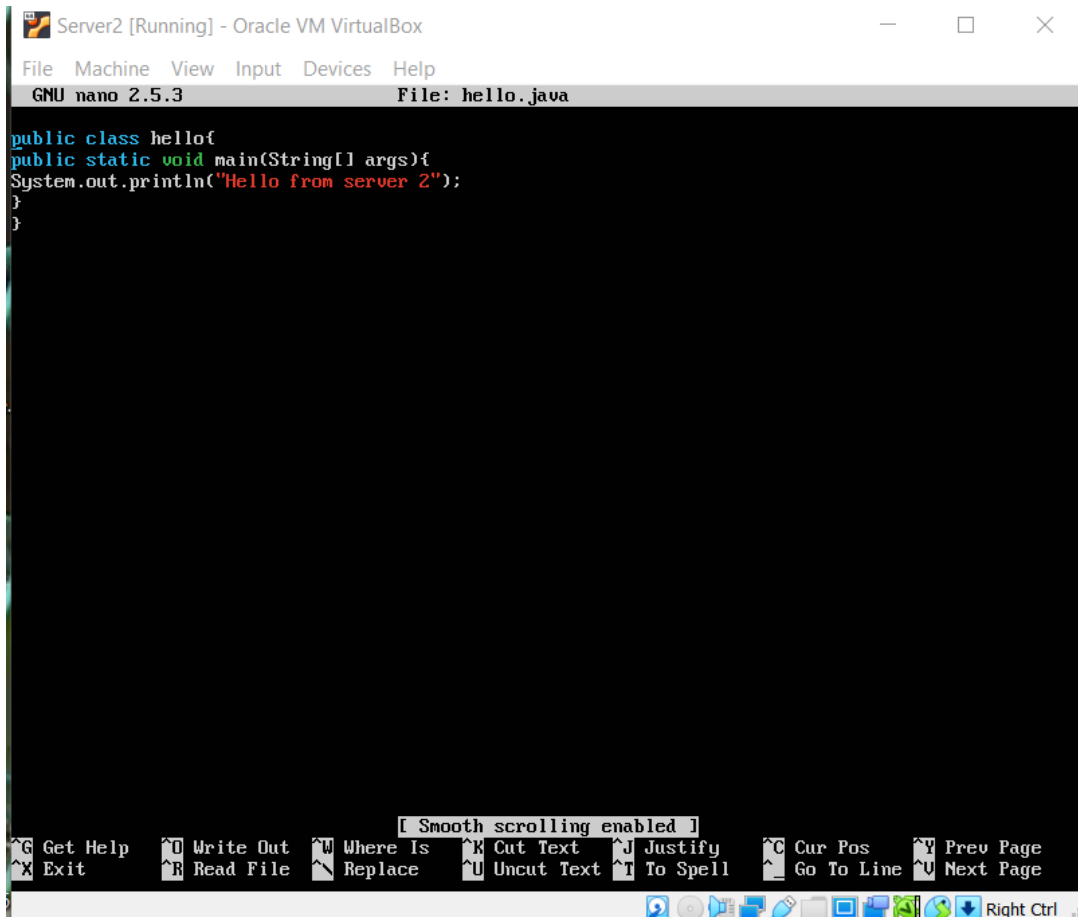
   https://microk8s.io/ has docs and details.

28 packages can be updated.
23 updates are security updates.

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

Last login: Mon Sep 14 23:20:07 2020
vaishali2@ubuntuserver2:~$ _
```

- hello.java in VM2



Server2 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

GNU nano 2.5.3 File: hello.java

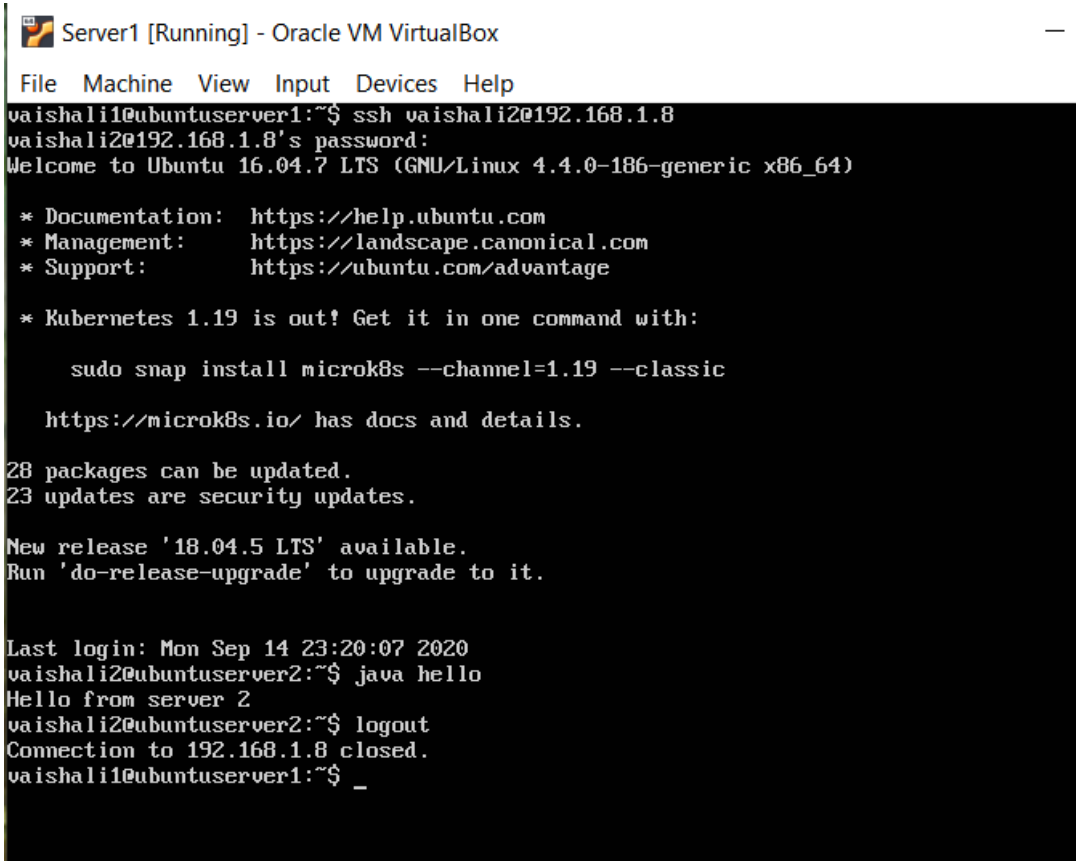
```
public class hello{
public static void main(String[] args){
System.out.println("Hello from server 2");
}
}
```

[ Smooth scrolling enabled ]

Get Help Write Out Where Is Cut Text Justify Cur Pos Prev Page  
Exit Read File Replace Uncut Text To Spell Go To Line Next Page

Right Ctrl

## • Execution of hello.java in VM2 from VM1



```
Server1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
vaishali1@ubuntuserver1:~$ ssh vaishali2@192.168.1.8
vaishali2@192.168.1.8's 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

 * Kubernetes 1.19 is out! Get it in one command with:

   sudo snap install microk8s --channel=1.19 --classic

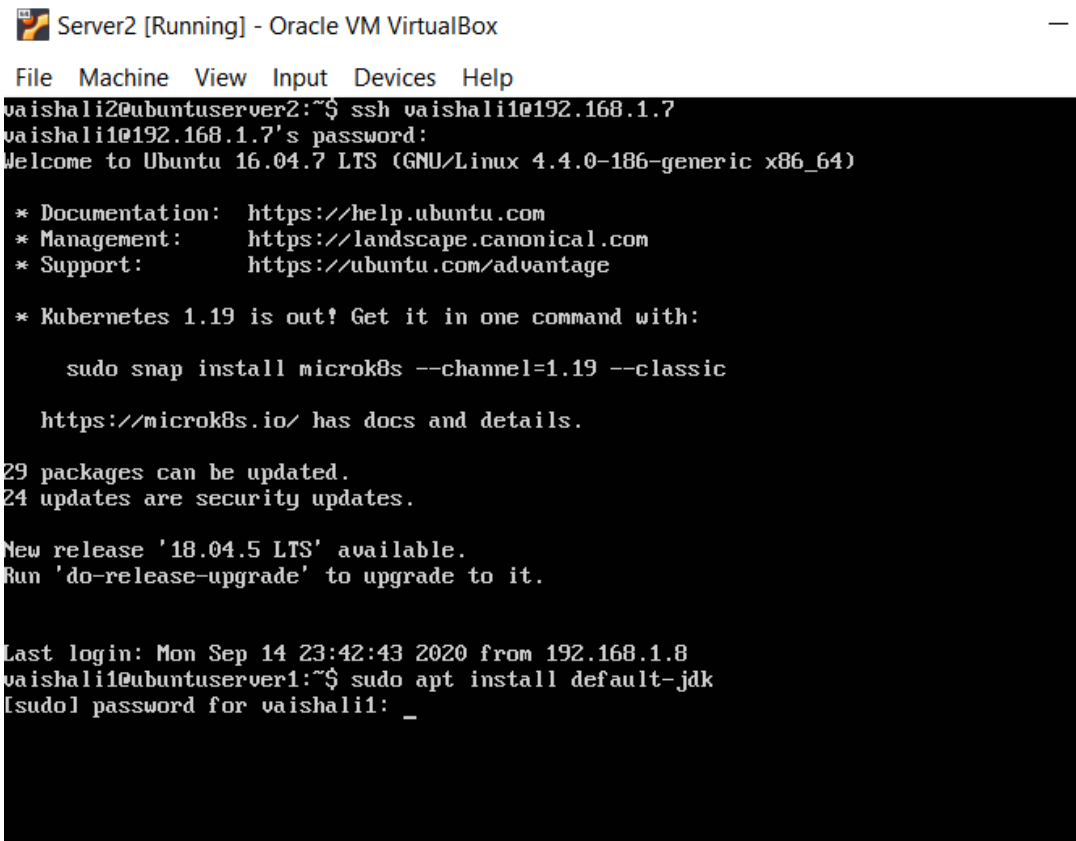
   https://microk8s.io/ has docs and details.

28 packages can be updated.
23 updates are security updates.

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

Last login: Mon Sep 14 23:20:07 2020
vaishali2@ubuntuserver2:~$ java hello
Hello from server 2
vaishali2@ubuntuserver2:~$ logout
Connection to 192.168.1.8 closed.
vaishali1@ubuntuserver1:~$ _
```

## • Installation of java in VM1 from VM2



```
Server2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
vaishali2@ubuntuserver2:~$ ssh vaishali1@192.168.1.7
vaishali1@192.168.1.7's 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

 * Kubernetes 1.19 is out! Get it in one command with:

   sudo snap install microk8s --channel=1.19 --classic

   https://microk8s.io/ has docs and details.

29 packages can be updated.
24 updates are security updates.

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

Last login: Mon Sep 14 23:42:43 2020 from 192.168.1.8
vaishali1@ubuntuserver1:~$ sudo apt install default-jdk
[sudo] password for vaishali1: _
```

```
Server1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Ubuntu 16.04.7 LTS ubuntuuser1 tty1

ubuntuuser1 login: vaishali1
Password:
Last login: Mon Sep 14 23:44:55 IST 2020 from 192.168.1.8 on pts/0
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

 * Kubernetes 1.19 is out! Get it in one command with:

    sudo snap install microk8s --channel=1.19 --classic

    https://microk8s.io/ has docs and details.

29 packages can be updated.
24 updates are security updates.

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

vaishali1@ubuntuuser1:~$ java -version
openjdk version "1.8.0_265"
OpenJDK Runtime Environment (build 1.8.0_265-8u265-b01-0ubuntu2~16.04-b01)
OpenJDK 64-Bit Server VM (build 25.265-b01, mixed mode)
vaishali1@ubuntuuser1:~$ _
```

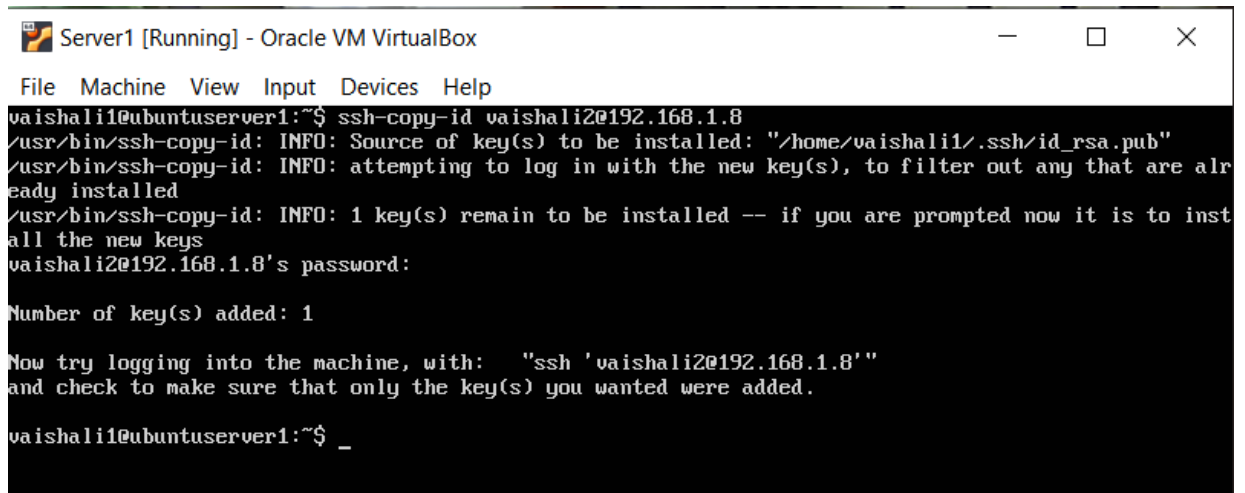
### 3. Remote login without password

- Create ssh-keypair using the command `$ ssh-keygen -t rsa` and change permission for `id_rsa.pub` as 700.

```
Server1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

vaishali1@ubuntuuser1:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/vaishali1/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/vaishali1/.ssh/id_rsa.
Your public key has been saved in /home/vaishali1/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:zSM7kM4TAK6iy5ecdEMNpKMilKS8o8HxL26dl1AUVUc0 vaishali1@ubuntuuser1
The key's randomart image is:
+----[RSA 2048]----+
| . . . .o...o |
|+ . o. . . E |
|.= + .o . |
|o = o..o . |
|+= o. ..S.. |
|=.o..+ + . |
|o.o.=.+o.o.o |
|o .*.o o+ .o . |
|oo. . . . |
+----[SHA256]-----+
vaishali1@ubuntuuser1:~$ cd .ssh
vaishali1@ubuntuuser1:~/.ssh$ chmod 700 id_rsa.pub
vaishali1@ubuntuuser1:~/.ssh$
```

- Copy authorized\_keys / id\_rsa.pub into VM2 using the command  
\$ `ssh-copy-id <UsernameVM2>@<IP_Address_VM2>`

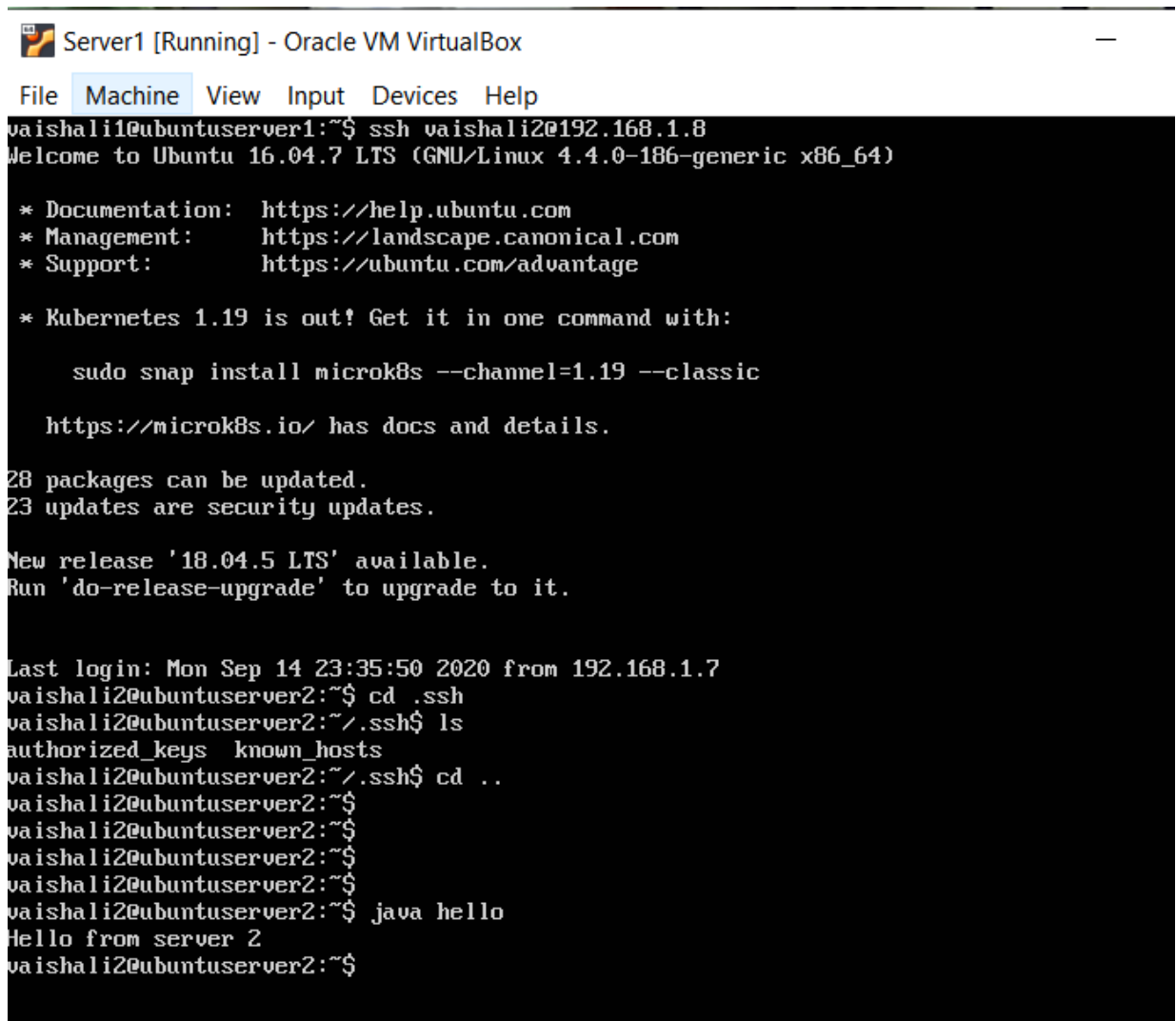


```

Server1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
vaishali1@ubuntuserver1:~$ ssh-copy-id vaishali2@192.168.1.8
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/vaishali1/.ssh/id_rsa.pub"
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install all the new keys
vaishali2@192.168.1.8's password:
Number of key(s) added: 1
Now try logging into the machine, with: "ssh 'vaishali2@192.168.1.8'"
and check to make sure that only the key(s) you wanted were added.
vaishali1@ubuntuserver1:~$ _

```

- Remote login into VM2 from VM1 \$ `ssh <usernameVM2>@<IP_Address_VM2>`



```

Server1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
vaishali1@ubuntuserver1:~$ ssh vaishali2@192.168.1.8
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

 * Kubernetes 1.19 is out! Get it in one command with:

   sudo snap install microk8s --channel=1.19 --classic

https://microk8s.io/ has docs and details.

28 packages can be updated.
23 updates are security updates.

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

Last login: Mon Sep 14 23:35:50 2020 from 192.168.1.7
vaishali2@ubuntuserver2:~$ cd .ssh
vaishali2@ubuntuserver2:~/.ssh$ ls
authorized_keys  known_hosts
vaishali2@ubuntuserver2:~/.ssh$ cd ..
vaishali2@ubuntuserver2:~$
vaishali2@ubuntuserver2:~$
vaishali2@ubuntuserver2:~$
vaishali2@ubuntuserver2:~$
vaishali2@ubuntuserver2:~$ java hello
Hello from server 2
vaishali2@ubuntuserver2:~$

```