

# Q1 Virtual Machine Setup

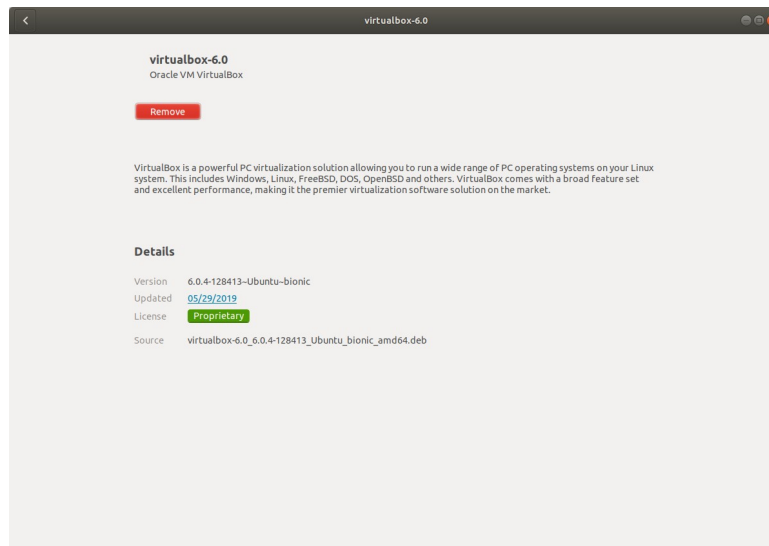
a. Linux White Paper - Downloaded from

<http://www.oracle.com/us/technologies/virtualization/oracle-vm-virtualbox-overview-2981353.pdf>

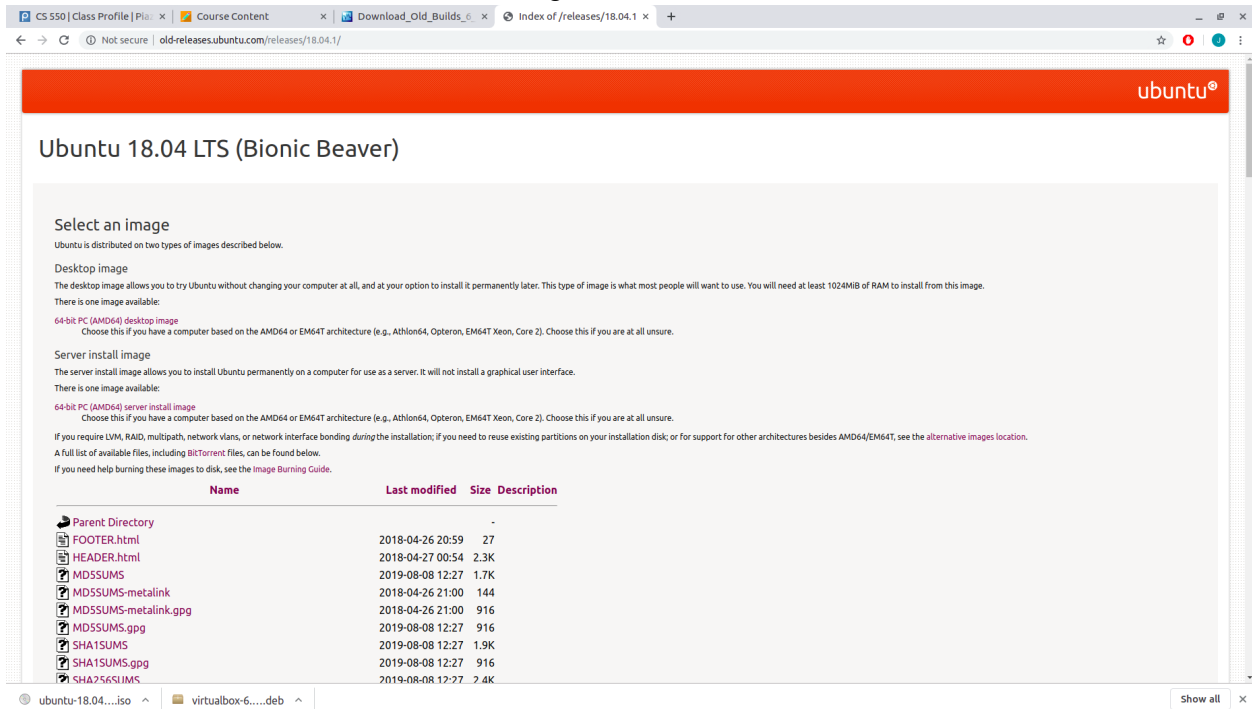
b. Download Oracle VirtualBox 6.0



c. Install VirtualBox



## d. Download Ubuntu 18.04 Linux ISO Image



ubuntu®

### Ubuntu 18.04 LTS (Bionic Beaver)

**Select an image**  
Ubuntu is distributed on two types of images described below.

**Desktop image**  
The desktop image allows you to try Ubuntu without changing your computer at all, and at your option to install it permanently later. This type of image is what most people will want to use. You will need at least 1024MB of RAM to install from this image.  
There is one image available:

**64-bit PC (AMD64) desktop image**  
Choose this if you have a computer based on the AMD64 or EM64T architecture (e.g., Athlon64, Opteron, EM64T Xeon, Core 2). Choose this if you are at all unsure.

**Server install image**  
The server install image allows you to install Ubuntu permanently on a computer for use as a server. It will not install a graphical user interface.  
There is one image available:

**64-bit PC (AMD64) server install image**  
Choose this if you have a computer based on the AMD64 or EM64T architecture (e.g., Athlon64, Opteron, EM64T Xeon, Core 2). Choose this if you are at all unsure.

If you require LVM, RAID, multipath, network vlans, or network interface bonding during the installation; if you need to reuse existing partitions on your installation disk; or for support for other architectures besides AMD64/EM64T, see the [alternative images location](#).  
A full list of available files, including [BitTorrent](#) files, can be found below.  
If you need help burning these images to disk, see the [Image Burning Guide](#).


Name	Last modified	Size	Description
Parent Directory	-	-	-
FOOTER.html	2018-04-26 20:59	27	
HEADER.html	2018-04-27 00:54	2.3K	
MD5SUMS	2019-08-08 12:27	1.7K	
MD5SUMS-metalink	2018-04-26 21:00	144	
MD5SUMS-metalink.gpg	2018-04-26 21:00	916	
MD5SUMS.gpg	2019-08-08 12:27	916	
SHA1SUMS	2019-08-08 12:27	1.9K	
SHA1SUMS.gpg	2019-08-08 12:27	916	
SHA256SUMS	2019-08-08 12:27	2.4K	

ubuntu-18.04....iso    virtualbox-6....deb    Show all

## e. Virtual Machine Creation

### e.1.

### 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:



### e.2. Memory allocation - 4GB

### Create Virtual Machine



## Memory size

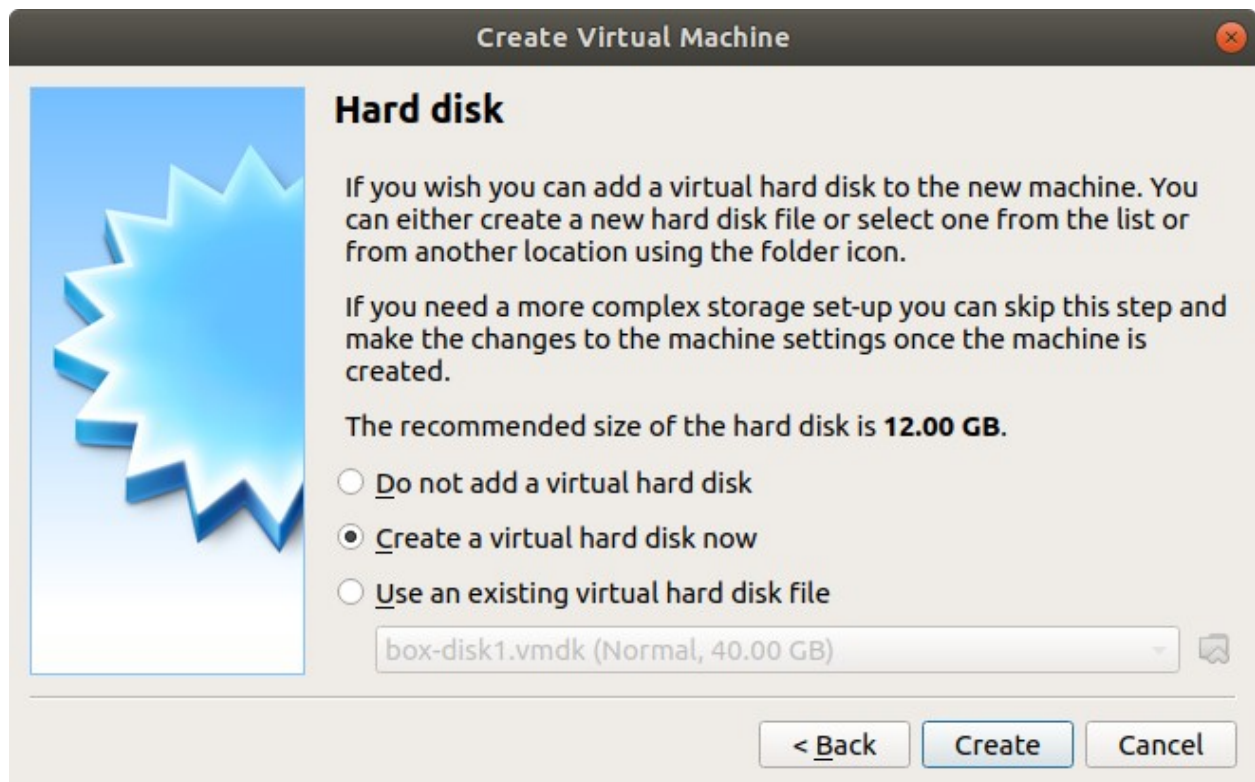
Select the amount of memory (RAM) in megabytes to be allocated to the virtual machine.

The recommended memory size is **1024 MB**.

MB

4 MB 16384 MB

### e.3. Virtual hardisk creation



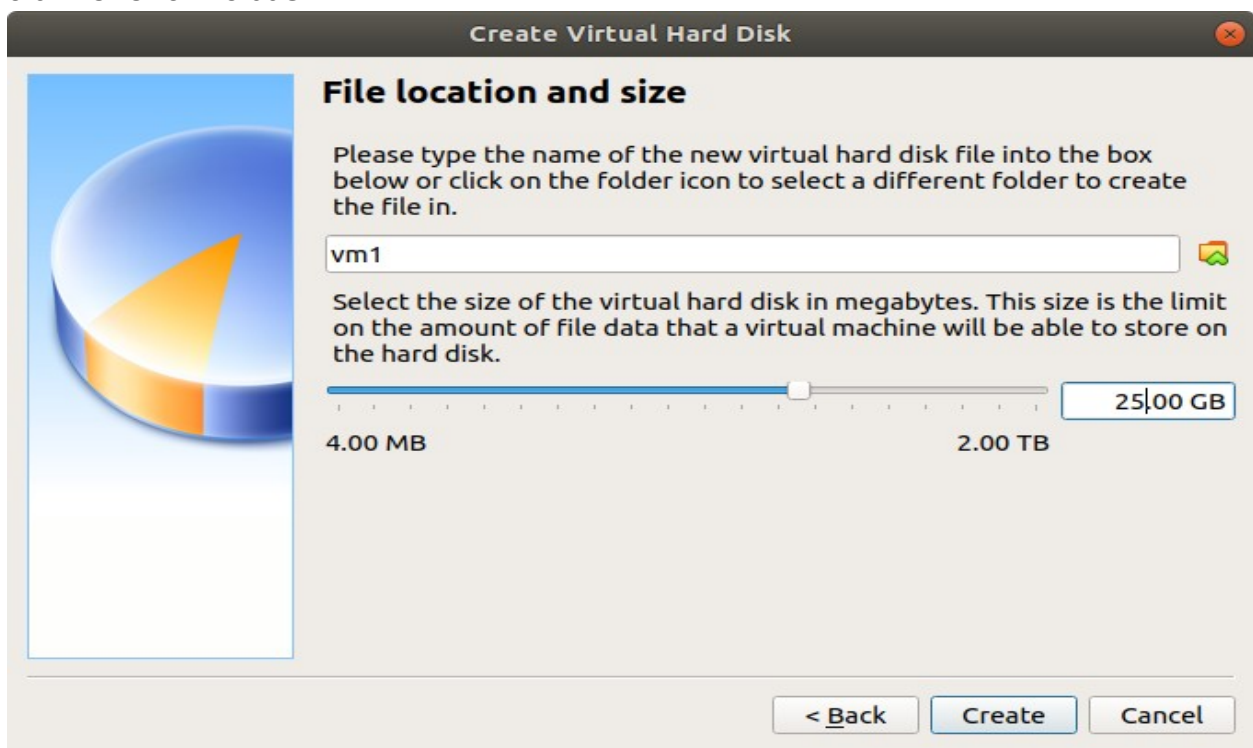
### e.4. Virtual hardisk type - VDI



e.5. Dynamically allocated disk

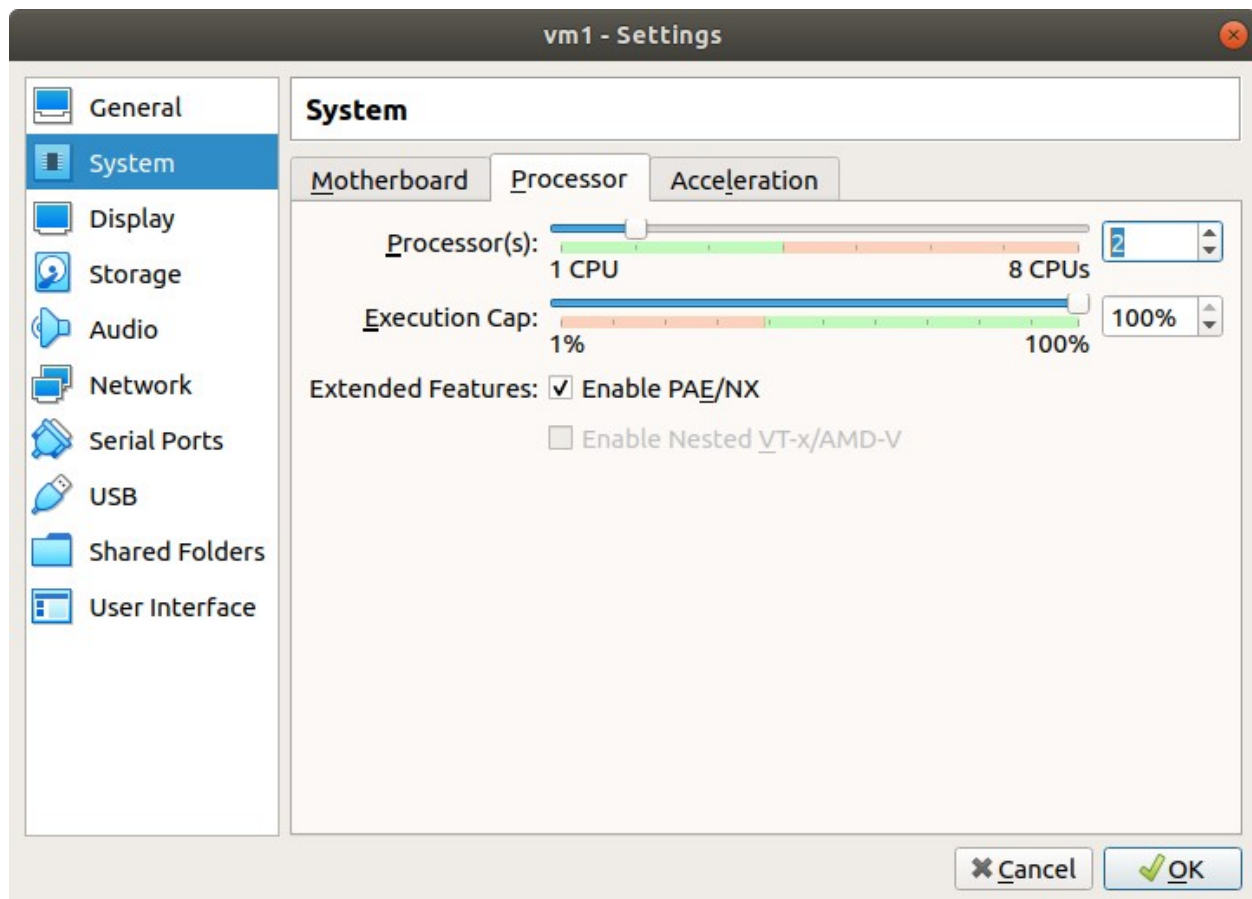


e.6. Disk size - 25.00GB

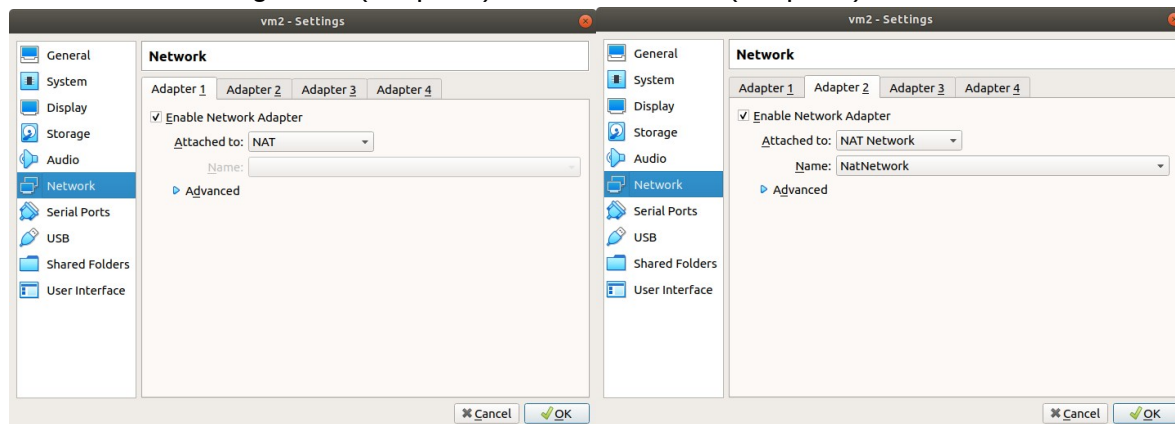




e.7. Processor - 1->2



e.8. Network settings, NAT(adapter1) and NAT network(adapter2)

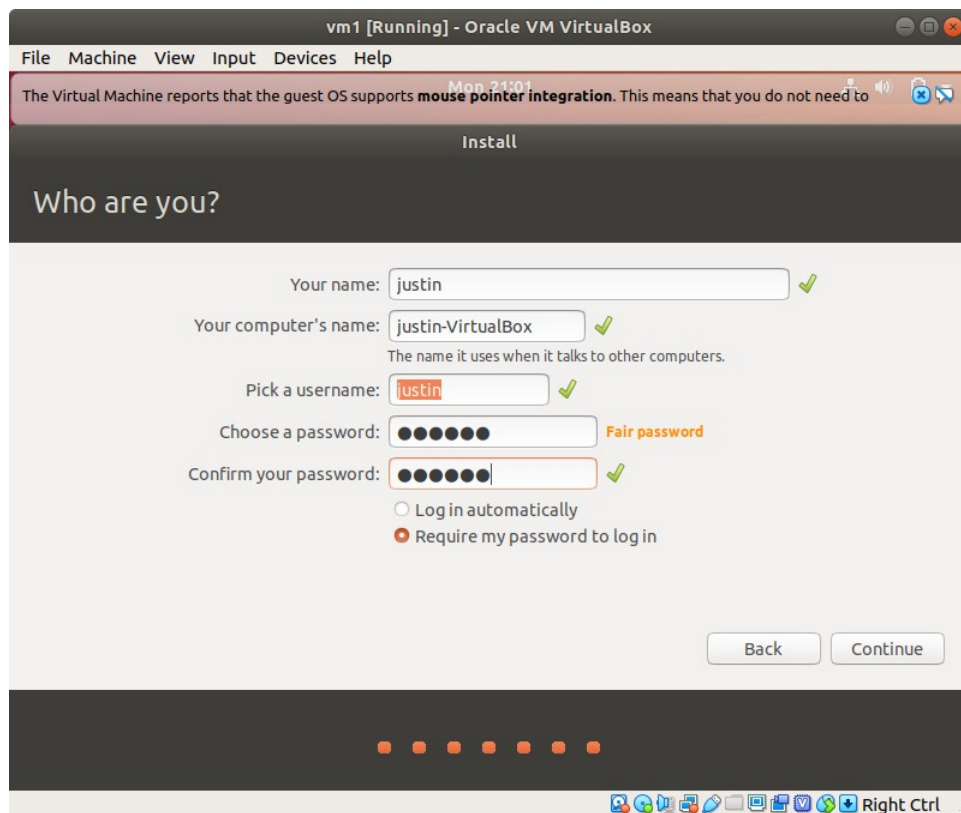


## f. Ubuntu Installation

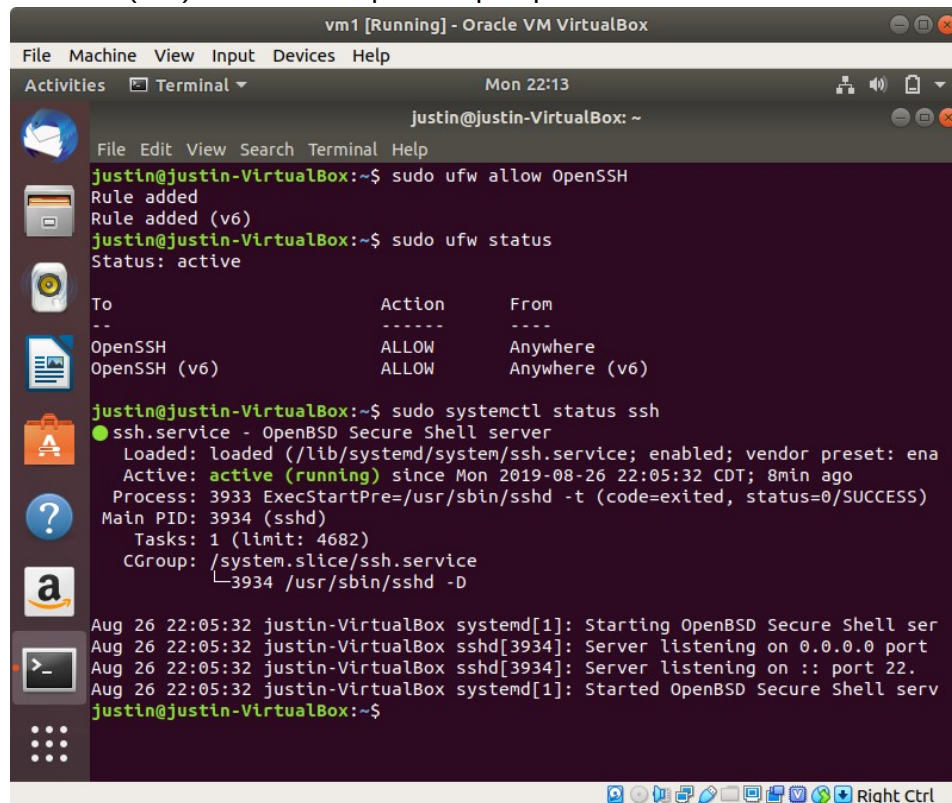
### f.1. Select the downloaded ISO Image



### f.2. Setup user account



h, i. Turn on firewall (ufw) and block all ports. Open port for ssh and enable ssh access.



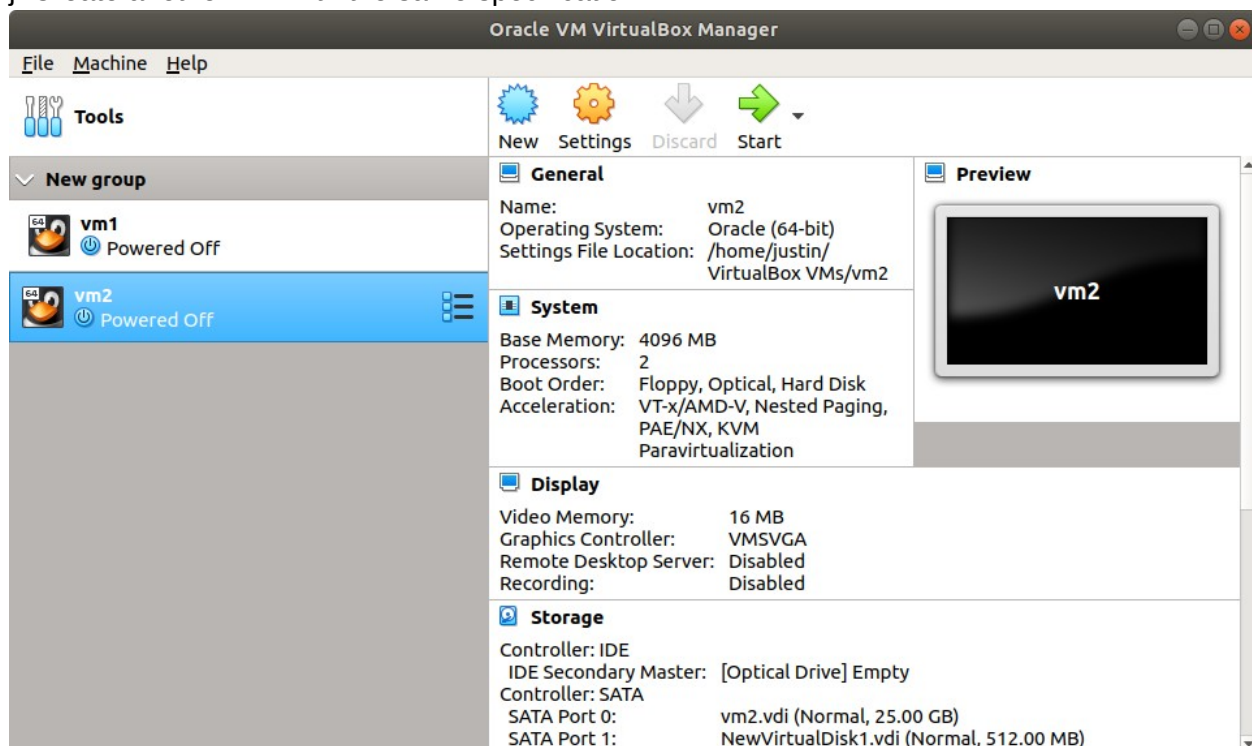
```
vm1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Mon 22:13
justin@justin-VirtualBox: ~
File Edit View Search Terminal Help
justin@justin-VirtualBox:~$ sudo ufw allow OpenSSH
Rule added
Rule added (v6)
justin@justin-VirtualBox:~$ sudo ufw status
Status: active

To Action From
--
OpenSSH ALLOW Anywhere
OpenSSH (v6) ALLOW Anywhere (v6)

justin@justin-VirtualBox:~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: ena
   Active: active (running) since Mon 2019-08-26 22:05:32 CDT; 8min ago
   Process: 3933 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 3934 (sshd)
   Tasks: 1 (limit: 4682)
   CGroup: /system.slice/ssh.service
           └─3934 /usr/sbin/sshd -D

Aug 26 22:05:32 justin-VirtualBox systemd[1]: Starting OpenBSD Secure Shell ser
Aug 26 22:05:32 justin-VirtualBox sshd[3934]: Server listening on 0.0.0.0 port
Aug 26 22:05:32 justin-VirtualBox sshd[3934]: Server listening on :: port 22.
Aug 26 22:05:32 justin-VirtualBox systemd[1]: Started OpenBSD Secure Shell serv
justin@justin-VirtualBox:~$
```

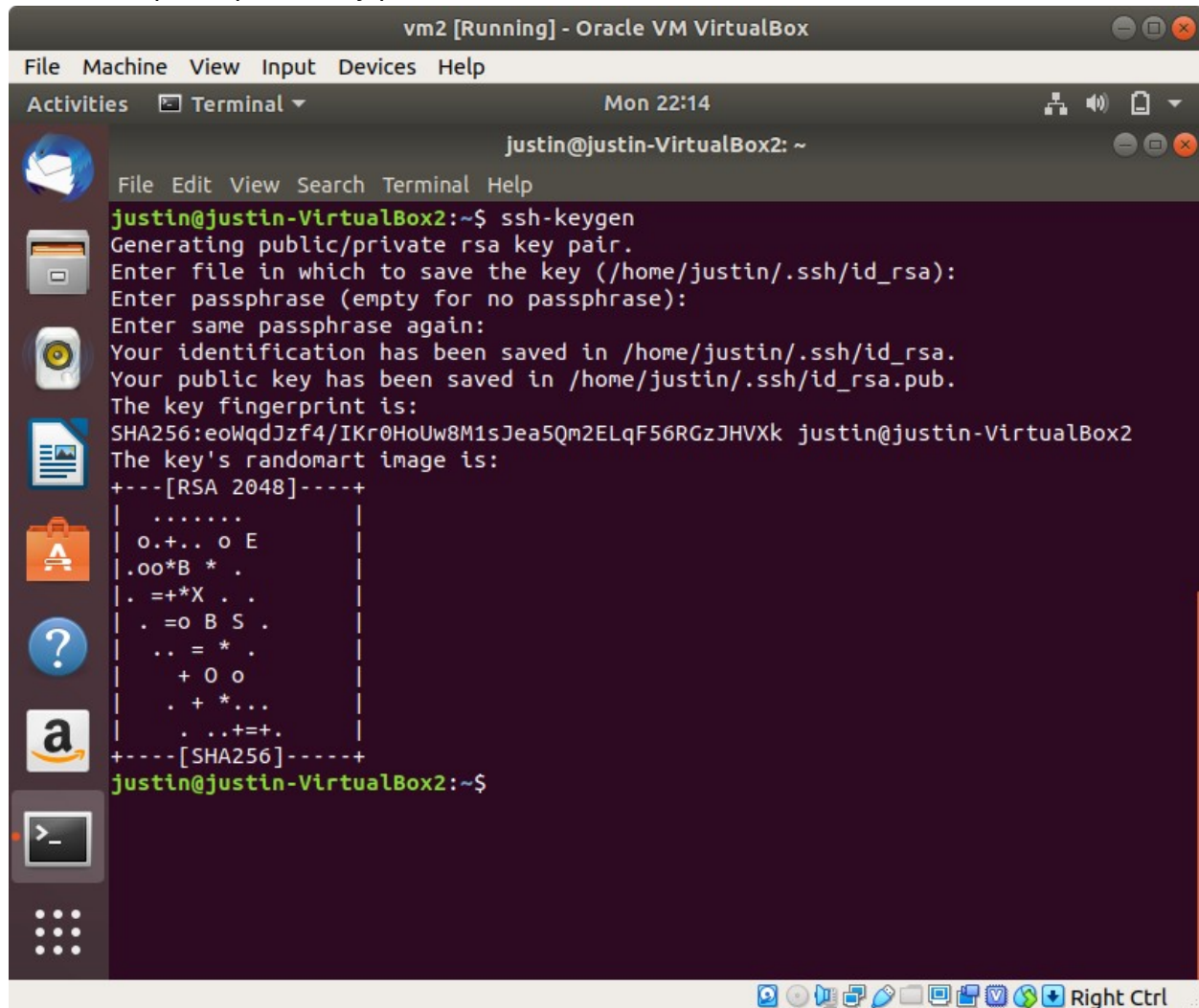
j. Create another VM with the same specification





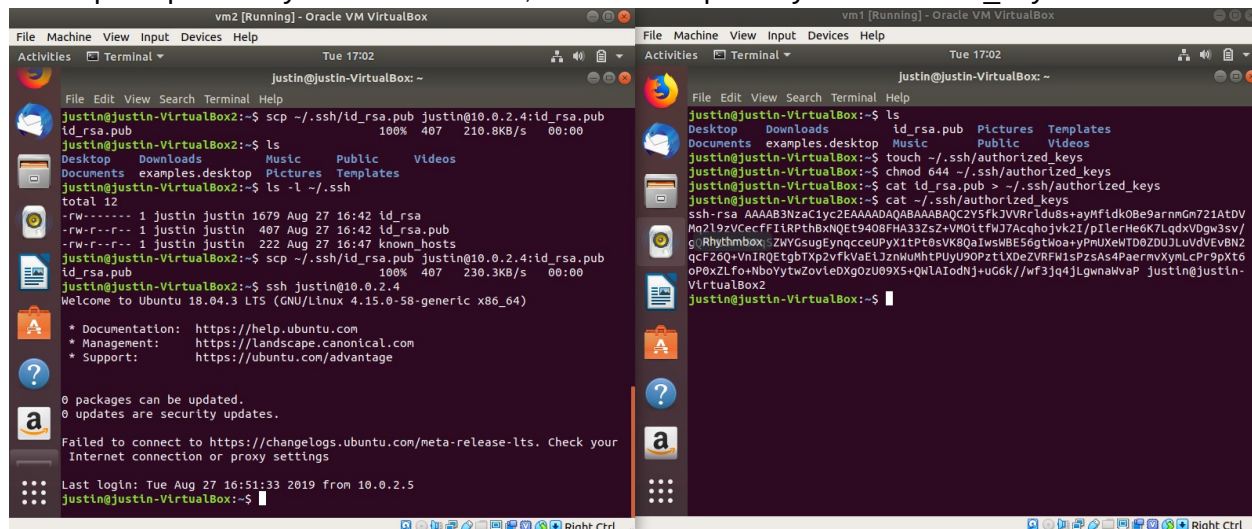
k. Create public/private keys, and install them for ssh authentication.

k.1. Create public/private key pair in vm2



```
vm2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Mon 22:14
justin@justin-VirtualBox2: ~
File Edit View Search Terminal Help
justin@justin-VirtualBox2:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/justin/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/justin/.ssh/id_rsa.
Your public key has been saved in /home/justin/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:eoWqdJzf4/IKr0HoUw8M1sJea5Qm2ELqF56RGzJHVXk justin@justin-VirtualBox2
The key's randomart image is:
+---[RSA 2048]---+
| . . . . .
| o+. . o E
| .oo*B * .
| . =+*X . .
| . =o B S .
| . . = * .
| . + 0 o
| . + *...
| . . .+=+.
+-----[SHA256]-----+
justin@justin-VirtualBox2:~$
```

k.2. scp the public key from vm2 to vm1, and add the pub key to authorized\_keys



```
vm2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Tue 17:02
justin@justin-VirtualBox: ~
File Edit View Search Terminal Help
justin@justin-VirtualBox2:~$ scp ~/.ssh/id_rsa.pub justin@10.0.2.4:id_rsa.pub
id_rsa.pub 100% 407 210.8KB/s 00:00
justin@justin-VirtualBox2:~$ ls
Desktop Downloads Music Public Videos
Documents examples.desktop Pictures Templates
justin@justin-VirtualBox2:~$ ls -l ~/.ssh
total 12
-rw-r----- 1 justin justin 1679 Aug 27 16:42 id_rsa
-rw-r--r-- 1 justin justin 407 Aug 27 16:42 id_rsa.pub
-rw-r--r-- 1 justin justin 222 Aug 27 16:47 known_hosts
justin@justin-VirtualBox2:~$ scp ~/.ssh/id_rsa.pub justin@10.0.2.4:id_rsa.pub
id_rsa.pub 100% 407 230.3KB/s 00:00
justin@justin-VirtualBox2:~$ ssh justin@10.0.2.4
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 4.15.0-58-generic x86_64)

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

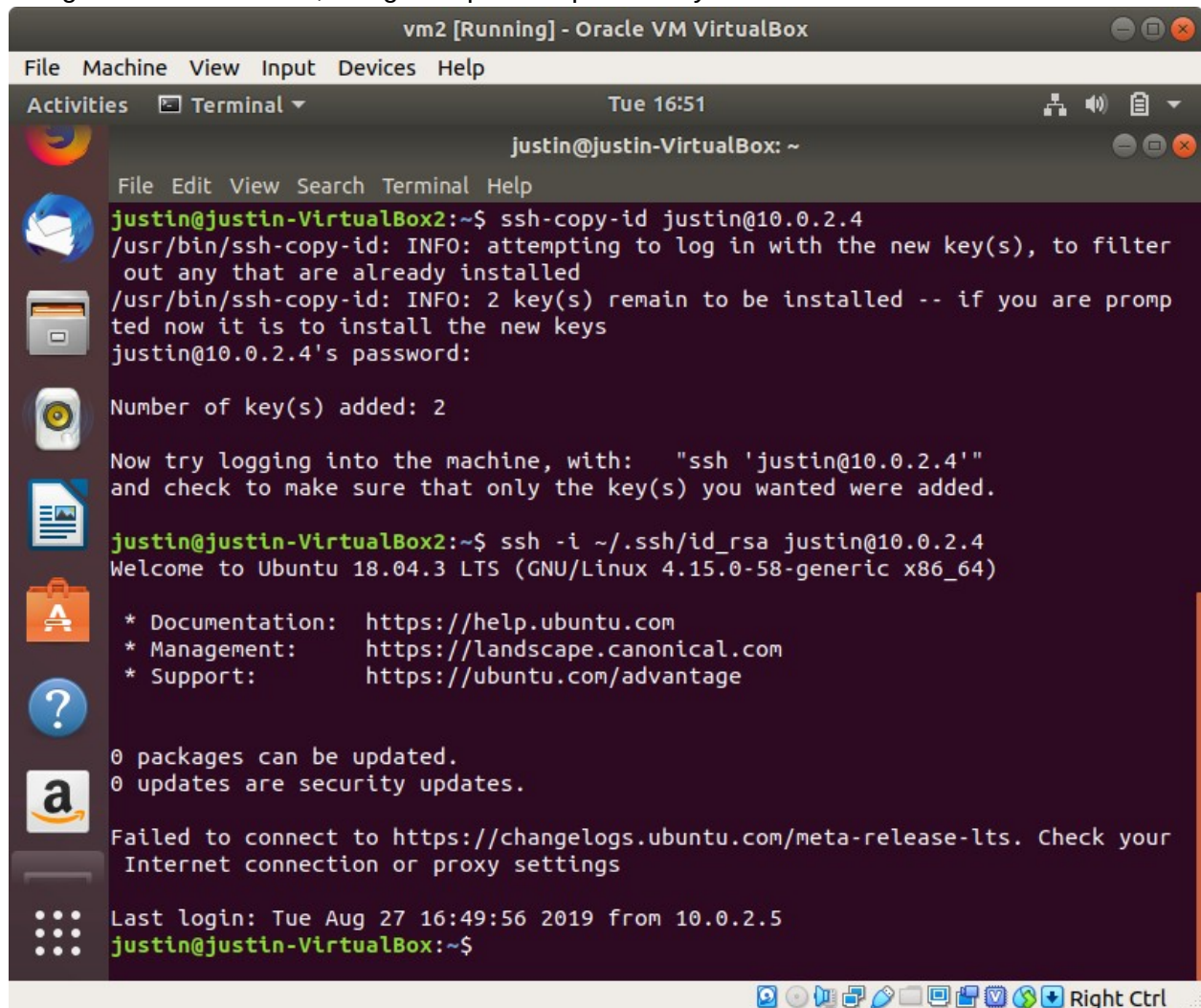
0 packages can be updated.
0 updates are security updates.

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your
Internet connection or proxy settings

Last login: Tue Aug 27 16:51:33 2019 from 10.0.2.5
justin@justin-VirtualBox:~$
```

```
vm1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Tue 17:02
justin@justin-VirtualBox: ~
File Edit View Search Terminal Help
justin@justin-VirtualBox:~$ ls
Desktop Downloads id_rsa.pub Pictures Templates
Documents examples.desktop Music Public Videos
justin@justin-VirtualBox:~$ touch ~/.ssh/authorized_keys
justin@justin-VirtualBox:~$ chmod 644 ~/.ssh/authorized_keys
justin@justin-VirtualBox:~$ cat id_rsa.pub > ~/.ssh/authorized_keys
justin@justin-VirtualBox:~$ cat ~/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCA2V5fk0VVR:IdU8s+syVfidk0Be9arnmGw721AtDV
Ma219zVcecfFiRPhthbXNQEt9408FHA33ZsZ+VM01tFWJ7Acqhojvk2I/pilerHeK7LqdxVDgw3sv/
g/Rhythmbox:ZNVGsgEynqccelUPyX1tPt8sVK8QaIwsWBE56gtWoa+YpNuxXwT08ZDUJLuvdEVBN2
qcF26Q+VnIRQEtqbTXp2vfkVaElJznWhtPUYU90PztTLXDeZVRFW1sPzSAs4PaernvXynLcPr9pXt6
oP6XZLFo+NBoYytWZovleDXG0zU09X5+QnLAIodNj+uG6k//wf3jq4JLgwnaWvaP justin@justin-
VirtualBox2
justin@justin-VirtualBox:~$
```

I. Login to vm1 from vm2, using the specified private key



The screenshot shows a terminal window titled "vm2 [Running] - Oracle VM VirtualBox". The terminal is running on a system named "justin@justin-VirtualBox2". The user has executed the command `ssh-copy-id justin@10.0.2.4`. The output of this command is as follows:

```
justin@justin-VirtualBox2:~$ ssh-copy-id justin@10.0.2.4
/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: 2 key(s) remain to be installed -- if you are promp
ted now it is to install the new keys
justin@10.0.2.4's password:

Number of key(s) added: 2

Now try logging into the machine, with:  "ssh 'justin@10.0.2.4'"
and check to make sure that only the key(s) you wanted were added.

justin@justin-VirtualBox2:~$ ssh -i ~/.ssh/id_rsa justin@10.0.2.4
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 4.15.0-58-generic x86_64)

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

0 packages can be updated.
0 updates are security updates.

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your
Internet connection or proxy settings

Last login: Tue Aug 27 16:49:56 2019 from 10.0.2.5
justin@justin-VirtualBox:~$
```

The terminal window also shows a sidebar with various application icons and a top bar with the time "Tue 16:51".

