

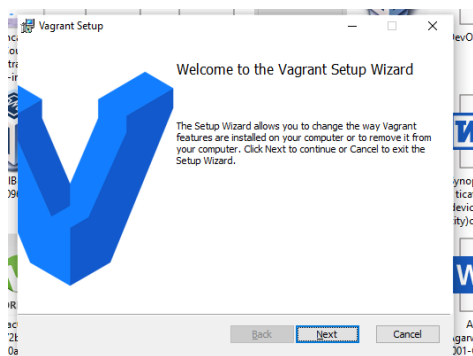
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EXPERIMENT-1

Aim- Installation and execution of Vagrant and configuration of Docker and starting its container in vagrant.

1) Download vagrant from the website of Hashi Corp and install it in your system.



2) Now create a directory for workspace and to initialize use command vagrant init.

```
Command Prompt
Microsoft Windows [Version 10.0.19042.804]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\Lenovo>vagrant --version
Vagrant 2.2.0

C:\Users\Lenovo>mkdir vm101

C:\Users\Lenovo>cd vm 101
The system cannot find the path specified.

C:\Users\Lenovo>cd vm101

C:\Users\Lenovo\vm101>vagrant init
A `Vagrantfile` has been placed in this directory. You are now
ready to `vagrant up` your first virtual environment! Please read
the comments in the Vagrantfile as well as documentation on
`vagrantup.com` for more information on using Vagrant.
```

3) After initializing the vagrant successfully, vagrant file will be created in our workspace. We have to configure the vagrant file so that vagrant can create virtual machine. For this we set `config.vm.box= "Ubuntu/xenial64"`.

```
# For a complete reference, please see the online documentation at
# https://docs.vagrantup.com.

# Every Vagrant development environment requires a box. You can search fo
# boxes at https://vagrantcloud.com/search.
config.vm.box = "ubuntu/xenial64"
```

4) After successfully configuring the vagrant file, in command line run `vagrant up` command. This command will download Ubuntu and will create a virtual machine.

```
CA. Command Prompt
Microsoft Windows [Version 10.0.19042.804]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\Lenovo>cd vm101

C:\Users\Lenovo\vm101>vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Checking if box 'ubuntu/xenial64' is up to date...
==> default: Clearing any previously set forwarded ports...
==> default: Clearing any previously set network interfaces...
==> default: Preparing network interfaces based on configuration...
    default: Adapter 1: nat
==> default: Forwarding ports...
    default: 22 (guest) => 2222 (host) (adapter 1)
==> default: Running 'pre-boot' VM customizations...
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
    default: SSH address: 127.0.0.1:2222
    default: SSH username: vagrant
    default: SSH auth method: private key
    default: Warning: Connection aborted. Retrying...
    default: Warning: Connection reset. Retrying...
    default: Warning: Connection aborted. Retrying...
    default:
    default: Vagrant insecure key detected. Vagrant will automatically replace
    default: this with a newly generated keypair for better security.
    default:
    default: Inserting generated public key within guest...
    default: Removing insecure key from the guest if it's present...
    default: Key inserted! Disconnecting and reconnecting using new SSH key...
==> default: Machine booted and ready!
==> default: Checking for guest additions in VM...
    default: The guest additions on this VM do not match the installed version of
    default: VirtualBox! In most cases this is fine, but in rare cases it can
    default: prevent things such as shared folders from working properly. If you see
    default: shared folder errors, please make sure the guest additions within the
    default: virtual machine match the version of VirtualBox you have installed on
    default: your host and reload your VM.
    default:
    default: Guest Additions Version: 5.1.38
```

5) Now run the vagrant ssh command to attach the virtual machine to your windows command line. Now we can operate the virtual machine from windows command line.

```

C:\ vagrant@ubuntu-xenial: ~
default: /vagrant => C:/Users/Lenovo/vm101

C:\Users\Lenovo\vm101>vagrant ssh
Welcome to Ubuntu 16.04.7 LTS (GNU/Linux 4.4.0-201-generic x86_64)

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

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

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

```

6) We have to attach vagrant virtual machine and add GPG key for the official docker repository to your Ubuntu-xenial as shown below.

```

C:\ vagrant@ubuntu-xenial: ~
exp1
vagrant@ubuntu-xenial:~$ ls
exp1
vagrant@ubuntu-xenial:~$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
OK
vagrant@ubuntu-xenial:~$ sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable"
vagrant@ubuntu-xenial:~$ sudo apt-get update
Get:1 https://download.docker.com/linux/ubuntu xenial InRelease [66.2 kB]
Get:2 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages [18.2 kB]
Get:3 http://security.ubuntu.com/ubuntu xenial-security InRelease [109 kB]
Hit:4 http://archive.ubuntu.com/ubuntu xenial InRelease
Get:5 http://archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Get:6 http://security.ubuntu.com/ubuntu xenial-security/main amd64 Packages [1,547 kB]
Get:7 http://archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Get:8 http://archive.ubuntu.com/ubuntu xenial/universe amd64 Packages [7,532 kB]
Get:9 http://security.ubuntu.com/ubuntu xenial-security/universe amd64 Packages [785 kB]
Get:10 http://security.ubuntu.com/ubuntu xenial-security/universe Translation-en [224 kB]
Get:11 http://security.ubuntu.com/ubuntu xenial-security/multiverse amd64 Packages [7,864 B]
Get:12 http://security.ubuntu.com/ubuntu xenial-security/multiverse Translation-en [2,672 B]
Get:13 http://archive.ubuntu.com/ubuntu xenial/universe Translation-en [4,354 kB]
Get:14 http://archive.ubuntu.com/ubuntu xenial/multiverse amd64 Packages [144 kB]
Get:15 http://archive.ubuntu.com/ubuntu xenial/multiverse Translation-en [106 kB]
Get:16 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [1,946 kB]
Get:17 http://archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [1,217 kB]
Get:18 http://archive.ubuntu.com/ubuntu xenial-updates/universe Translation-en [355 kB]
Get:19 http://archive.ubuntu.com/ubuntu xenial-updates/multiverse amd64 Packages [22.6 kB]
Get:20 http://archive.ubuntu.com/ubuntu xenial-updates/multiverse Translation-en [8,476 B]
Get:21 http://archive.ubuntu.com/ubuntu xenial-backports/main amd64 Packages [9,812 B]
Get:22 http://archive.ubuntu.com/ubuntu xenial-backports/main Translation-en [4,456 B]
Get:23 http://archive.ubuntu.com/ubuntu xenial-backports/universe amd64 Packages [11.3 kB]
Get:24 http://archive.ubuntu.com/ubuntu xenial-backports/universe Translation-en [4,476 B]
Fetched 18.7 MB in 41s (452 kB/s)
Reading package lists... Done
vagrant@ubuntu-xenial:~$

```

7) Use command apt-cache policy docker-ce to add docker repository to APT resources.

```
vagrant@ubuntu-xenial: ~  
Reading package lists... Done  
vagrant@ubuntu-xenial:~$ apt-cache policy docker-ce  
docker-ce:  
  Installed: (none)  
  Candidate: 5:20.10.3~3-0~ubuntu-xenial  
  Version table:  
   5:20.10.3~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:20.10.2~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:20.10.1~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:20.10.0~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.15~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.14~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.13~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.12~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.11~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.10~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.9~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.8~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.7~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.6~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.5~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.4~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.3~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.2~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages  
   5:19.03.1~3-0~ubuntu-xenial 500  
     500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages
```

8) Now update the package database with the docker packages from the recently added repository and then update the policy. After this install the docker with `sudo apt-get install -y docker-ce`.

```

vagrant@ubuntu-xenial:~$ sudo apt-get install -y docker-ce
500 https://download.docker.com/linux/ubuntu xenial/stable amd64 Packages
vagrant@ubuntu-xenial:~$ sudo apt-get install -y docker-ce
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  containerd.io docker-ce-cli docker-ce-rootless-extras libltdl7 pigz
Suggested packages:
  aufs-tools cgroupfs-mount | cgroup-lite
Recommended packages:
  slirp4netns
The following NEW packages will be installed:
  containerd.io docker-ce docker-ce-cli docker-ce-rootless-extras libltdl7 pigz
0 upgraded, 6 newly installed, 0 to remove and 0 not upgraded.
Need to get 103 MB of archives.
After this operation, 450 MB of additional disk space will be used.
Get:1 https://download.docker.com/linux/ubuntu xenial/stable amd64 containerd.io amd64 1.4.3-1 [28.0 MB]
Get:2 http://archive.ubuntu.com/ubuntu xenial/universe amd64 pigz amd64 2.3.1-2 [61.1 kB]
Get:3 http://archive.ubuntu.com/ubuntu xenial/main amd64 libltdl7 amd64 2.4.6-0.1 [38.3 kB]
Get:4 https://download.docker.com/linux/ubuntu xenial/stable amd64 docker-ce-cli amd64 5:20.10.3~3-0~ubuntu-xenial [41.1 MB]
Get:5 https://download.docker.com/linux/ubuntu xenial/stable amd64 docker-ce amd64 5:20.10.3~3-0~ubuntu-xenial [24.7 MB]
Get:6 https://download.docker.com/linux/ubuntu xenial/stable amd64 docker-ce-rootless-extras amd64 5:20.10.3~3-0~ubuntu-xenial [8,901 kB]
Fetched 103 MB in 12s (8,447 kB/s)
Selecting previously unselected package pigz.
(Reading database ... 54328 files and directories currently installed.)
Preparing to unpack .../pigz_2.3.1-2_amd64.deb ...
Unpacking pigz (2.3.1-2) ...
Selecting previously unselected package containerd.io.
Preparing to unpack .../containerd.io_1.4.3-1_amd64.deb ...
Unpacking containerd.io (1.4.3-1) ...
Selecting previously unselected package docker-ce-cli.
Preparing to unpack .../docker-ce-cli_5:20.10.3~3-0~ubuntu-xenial_amd64.deb ...
Unpacking docker-ce-cli (5:20.10.3~3-0~ubuntu-xenial) ...
Selecting previously unselected package docker-ce.
Preparing to unpack .../docker-ce_5:20.10.3~3-0~ubuntu-xenial_amd64.deb ...
Unpacking docker-ce (5:20.10.3~3-0~ubuntu-xenial) ...
Selecting previously unselected package docker-ce-rootless-extras.
Preparing to unpack .../docker-ce-rootless-extras_5:20.10.3~3-0~ubuntu-xenial_amd64.deb ...
Unpacking docker-ce-rootless-extras (5:20.10.3~3-0~ubuntu-xenial) ...
Selecting previously unselected package libltdl7:amd64.
Preparing to unpack .../libltdl7_2.4.6-0.1_amd64.deb ...
Unpacking libltdl7:amd64 (2.4.6-0.1) ...
Processing triggers for man-db (2.7.5-1) ...
Processing triggers for ureadahead (0.100.0-19.1) ...

```

9) To verify if docker is configured, use command `systemctl status docker`.

```

vagrant@ubuntu-xenial:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2021-02-18 03:46:48 UTC; 41s ago
     Docs: https://docs.docker.com
    Main PID: 13166 (dockerd)
      CGroup: /system.slice/docker.service
              └─13166 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Feb 18 03:46:48 ubuntu-xenial dockerd[13166]: time="2021-02-18T03:46:48.132428569Z" level=info msg="ClientConn switchingFeb 18 03:46:48 ubuntu-
me="2021-02-18T03:46:48.161693450Z" level=warning msg="Your kernel does
Feb 18 03:46:48 ubuntu-xenial dockerd[13166]: time="2021-02-18T03:46:48.161725595Z" level=warning msg="Your kernel does
Feb 18 03:46:48 ubuntu-xenial dockerd[13166]: time="2021-02-18T03:46:48.161027523Z" level=info msg="Loading containers:
Feb 18 03:46:48 ubuntu-xenial dockerd[13166]: time="2021-02-18T03:46:48.277015858Z" level=info msg="Default bridge (dockFeb 18 03:46:48 ubuntu-
me="2021-02-18T03:46:48.320725763Z" level=info msg="Loading containers:
Feb 18 03:46:48 ubuntu-xenial dockerd[13166]: time="2021-02-18T03:46:48.447211012Z" level=info msg="Docker daemon" commFeb 18 03:46:48 ubuntu-
me="2021-02-18T03:46:48.447367013Z" level=info msg="Daemon has completedFeb 18 03:46:48 ubuntu-xenial systemd[1]: Started Docker Application Co
Feb 18 03:46:48 ubuntu-xenial dockerd[13166]: time="2021-02-18T03:46:48.467026255Z" level=info msg="API listen on /var/r
lines 1-18/18 (END)

```

10) Now create a user for docker and add this user to vagrant group.

```

vagrant@ubuntu-xenial:~$ sudo usermod -aG docker $(USER)
vagrant@ubuntu-xenial:~$ su - $(USER)
Password:
su: Authentication failure
vagrant@ubuntu-xenial:~$ su - $(USER)
Password:
vagrant@ubuntu-xenial:~$ sudo usermod -aG docker vagrant
vagrant@ubuntu-xenial:~$ docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
ba5697f4ee43        Pull complete
ba13d3bc422b        Pull complete
a254829d9e55        Pull complete
Digest: sha256:fff16ee1a8ae92867721d90c59a75652ea66d29c052946e2f898704bdb8cf1
Status: Downloaded newer image for ubuntu:latest
root@999d271f39b5:/# fs layer

```

11) Use command `docker run -it Ubuntu` to create a container of Ubuntu image.

```
root@b99d271f39b5:/# vagrant@ubuntu-xenial:~$ docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
b99d271f39b5        ubuntu             "/bin/bash"        About a minute ago  Up About a minute  0.0.0.0:22->22     check
vagrant@ubuntu-xenial:~$
```