CSYE 6225: Network Structure & Cloud Computing Course
Assignment # 5-2

Lab Assignment: Usage of Private Cloud Management to deploy a VM and a web application

Prerequisites:

- Use a private cloud management platform: Pextra CloudEnvironment® or Proxmox®.
- Submission: Screen recording (one mp4 file).

Task 1: Create VM and mount disk

- Connect to the private cloud platform using UI.
- Deploy a new QEMU Virtual Machine with Debian.
- Minimal: Select 2 vCPU, 2G RAM, 4G memory on local disk, attach network interface.
- Show the Consol of the VM after creation.
- Connect to the console of the VM.
- Check available free storage: **$df -h**

```
root@debian-live:~# df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            978M     0  978M   0% /dev
tmpfs           199M  3.0M  196M   2% /run
/dev/sr0        276M  276M     0 100% /run/live/medium
/dev/loop0      220M  220M     0 100% /run/live/rootfs/filesystem.squashfs
tmpfs           994M   88K  994M   1% /run/live/overlay
overlay         994M   88K  994M   1% /
tmpfs           994M     0  994M   0% /dev/shm
tmpfs           5.0M     0  5.0M   0% /run/lock
tmpfs           994M     0  994M   0% /sys/fs/cgroup
tmpfs           994M     0  994M   0% /tmp
```

- Check available disks: $ lsblk

```
root@debian-live:~# lsblk
NAME  MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
loop0   7:0    0   220M  1 loop /usr/lib/live/mount/rootfs/filesystem.squashfs
sr0    11:0    1 279.2M  0 rom  /usr/lib/live/mount/medium
vda   254:0    0     4G  0 disk
root@debian-live:~#
```

- You should see the 4G disk under vda (/dev/vda). Additional disks will be (/dev/vdb, /dev/vdc …. etc)

- Now format the disk with ext4:

```
root@debian-live:~# mkfs.ext4 /dev/vda
mke2fs 1.44.5 (15-Dec-2018)
Creating filesystem with 1048576 4k blocks and 262144 inodes
Filesystem UUID: 576031ec-1ea3-4967-9e21-f99be8c9e146
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736

Allocating group tables: done
Writing inode tables: done
Creating journal (16384 blocks): done
Writing superblocks and filesystem accounting information: done

root@debian-live:~# _
```

- Now the disk is ready to mount (create a folder under /mnt/) then mount:
    - $mkdir /mnt/vda
    - $mount /dev/vda /mnt/vda

```
root@debian-live:~# mount /dev/vda /mnt/vda
[ 1664.450686] cryptd: max_cpu_qlen set to 1000
[ 1665.186448] EXT4-fs (vda): mounted filesystem with ordered data mode. Opts: (null)
root@debian-live:~#
```

- Check contents of the mounted disk (/dev/vda), create a text file.

```
root@debian-live:~# ls /mnt/vda
lost+found
root@debian-live:~# echo "Hello Private Cloud"  > /mnt/vda/hello.txt
root@debian-live:~# ls /mnt/vda
hello.txt  lost+found
root@debian-live:~# cat /mnt/vda/hello.txt
Hello Private Cloud
root@debian-live:~# _
```

Task 2: Deploy Nginx and view the default web page using curl

- To install nginx (web server) on Debian:
    - $apt update -y

```
root@debian-live:~# apt update -y
```

    - $apt install nginx

```
root@debian-live:~# apt update -y
Get:1 http://security.debian.org/debian-security buster/updates InRelease [34.8 kB]
Hit:2 http://deb.debian.org/debian buster InRelease
Hit:3 http://deb.debian.org/debian buster-updates InRelease
Get:4 http://security.debian.org/debian-security buster/updates/main Sources [388 kB]
Fetched 423 kB in 17s (25.6 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
root@debian-live:~# apt install nginx
```

- Upon completion, the nginx server is installed.
    - View (cat) the default page under /var/html/index/

```
root@debian-live:~# cat /var/www/html/index.nginx-debian.html
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
    body {
        width: 35em;
        margin: 0 auto;
        font-family: Tahoma, Verdana, Arial, sans-serif;
    }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
root@debian-live:~#
```

- Obtain the private IP address of this VM
    - $ip a

```
root@debian-live:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 52:54:00:a0:78:b4 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.223/24 brd 192.168.1.255 scope global dynamic ens1
       valid_lft 3458sec preferred_lft 3458sec
    inet6 fe80::5054:ff:fea0:78b4/64 scope link
       valid_lft forever preferred_lft forever
root@debian-live:~#
```

- Use curl to obtain contents on the local host on port 8080 (web)
    - $curl 192.168.1.223 (This Ip address depends on the outcome from the $ip a command).

```
root@debian-live:~# curl 192.168.1.223
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
    body {
        width: 35em;
        margin: 0 auto;
        font-family: Tahoma, Verdana, Arial, sans-serif;
    }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
root@debian-live:~#
```

- Edit the default page, save and run curl command again:

```
<!DOCTYPE html>
<html>
<head>
<title>Hello World!</title>
<style>
    body {
        width: 35em;
        margin: 0 auto;
        font-family: Tahoma, Verdana, Arial, sans-serif;
    }
</style>
</head>
<body>
<h1>Welcome to  my website!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
-- INSERT --
```

```
"/var/www/html/index.nginx-debian.html" 25L, 613C written
root@debian-live:~# curl 192.168.1.223
<!DOCTYPE html>
<html>
<head>
<title>Hello World!</title>
<style>
    body {
        width: 35em;
        margin: 0 auto;
        font-family: Tahoma, Verdana, Arial, sans-serif;
    }
</style>
</head>
<body>
<h1>Welcome to  my website!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
root@debian-live:~#
```

Submission:

- Submit mp4 video (compress the video) <100MB
- 100% for video and achieving all tasks.
- - 50% for incomplete submission.

End Assignment # 5-2