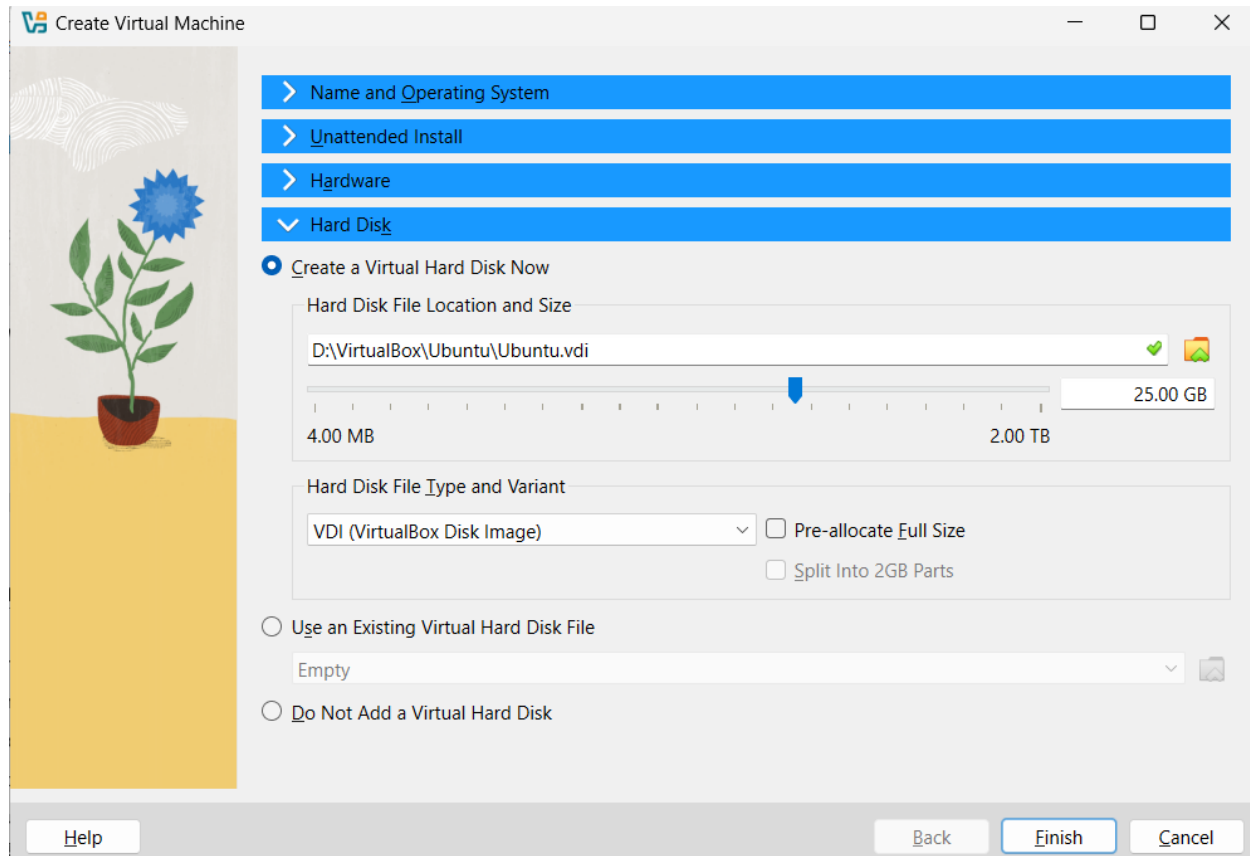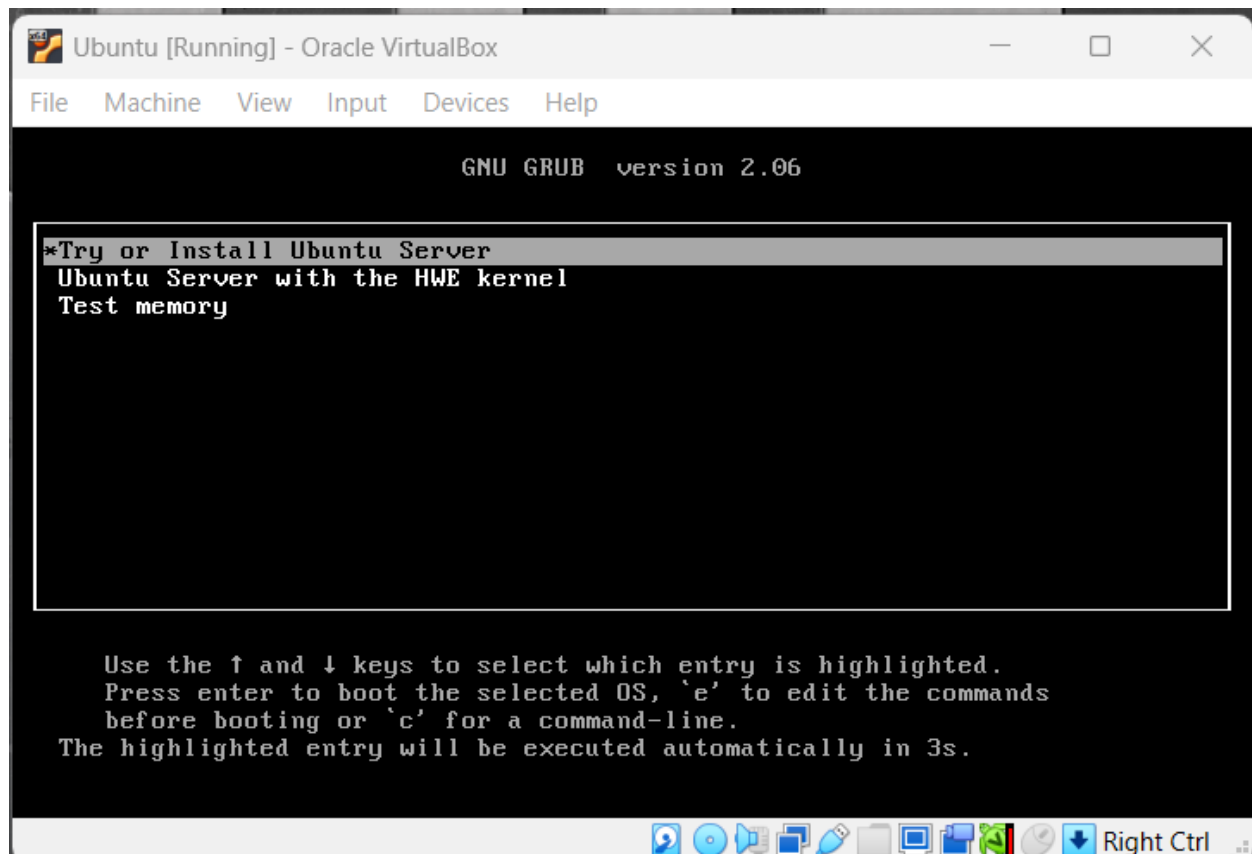# LAB 1 - Installing a virtual machine in VirtualBox & initial configuration

## 1.1 – Installing virtual machine

We install Ubuntu, CentOS 7 virtual machine into VirtualBox

After installation, we enter this code in Ubuntu virtual machine

sudo apt update

sudo apt dist-upgrade

File   Machine   View   Input   Devices   Help

```
  Swap usage:                0%
  Processes:                 101
  Users logged in:           0
  IPv4 address for enp0s3: 10.0.2.15
  IPv6 address for enp0s3: fd17:625c:f037:2:a00:27ff:fec0:6de9

Expanded Security Maintenance for Applications is not enabled.

55 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status




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.

hainam@Ubuntu:~$ sudo apt update
[sudo] password for hainam:
Hit:1 http://vn.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://vn.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://vn.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
54 packages can be upgraded. Run 'apt list --upgradable' to see them.
hainam@Ubuntu:~$ _
```

Right Ctrl

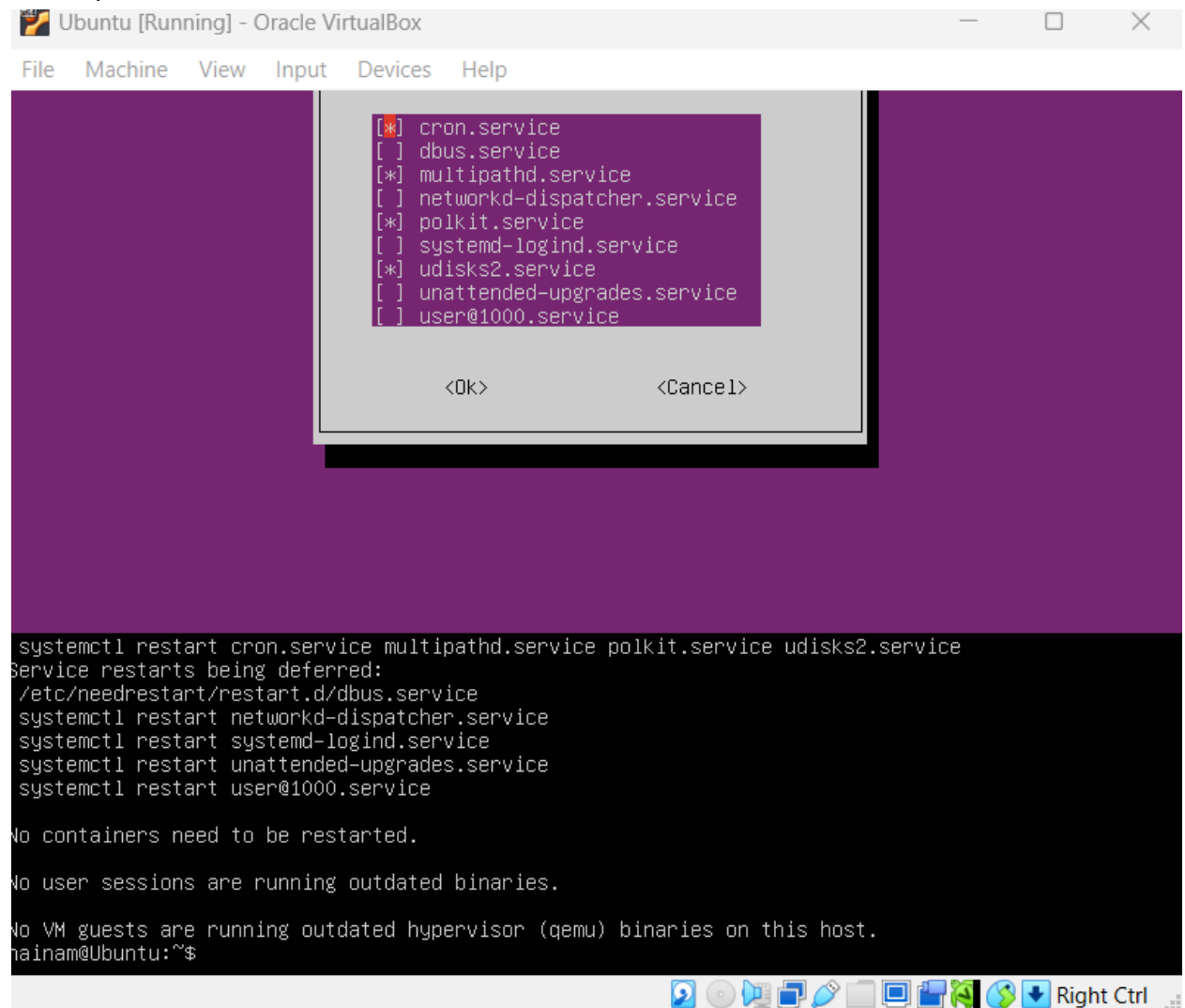File   Machine   View   Input   Devices   Help

```
Unpacking libudev1:amd64 (249.11-0ubuntu3.15) over (249.11-0ubuntu3.12) ...
Setting up libudev1:amd64 (249.11-0ubuntu3.15) ...
(Reading database ... 71919 files and directories currently installed.)
Preparing to unpack .../libpam-runtime_1.4.0-11ubuntu2.5_all.deb ...
Unpacking libpam-runtime (1.4.0-11ubuntu2.5) over (1.4.0-11ubuntu2.4) ...
Setting up libpam-runtime (1.4.0-11ubuntu2.5) ...
(Reading database ... 71919 files and directories currently installed.)
Preparing to unpack .../libdevmapper1.02.1_2%3a1.02.175-2.1ubuntu5_amd64.deb ...
Unpacking libdevmapper1.02.1:amd64 (2:1.02.175-2.1ubuntu5) over (2:1.02.175-2.1ubuntu4) ...
Preparing to unpack .../libcryptsetup12_2%3a2.4.3-1ubuntu1.3_amd64.deb ...
Unpacking libcryptsetup12:amd64 (2:2.4.3-1ubuntu1.3) over (2:2.4.3-1ubuntu1.2) ...
Preparing to unpack .../libseccomp2_2.5.3-2ubuntu3~22.04.1_amd64.deb ...
Unpacking libseccomp2:amd64 (2.5.3-2ubuntu3~22.04.1) over (2.5.3-2ubuntu2) ...
Setting up libseccomp2:amd64 (2.5.3-2ubuntu3~22.04.1) ...
(Reading database ... 71919 files and directories currently installed.)
Preparing to unpack .../00-libdevmapper-event1.02.1_2%3a1.02.175-2.1ubuntu5_amd64.deb ...
Unpacking libdevmapper-event1.02.1:amd64 (2:1.02.175-2.1ubuntu5) over (2:1.02.175-2.1ubuntu4) ...
Preparing to unpack .../01-dmsetup_2%3a1.02.175-2.1ubuntu5_amd64.deb ...
Unpacking dmsetup (2:1.02.175-2.1ubuntu5) over (2:1.02.175-2.1ubuntu4) ...
Preparing to unpack .../02-liblvm2cmd2.03_2.03.11-2.1ubuntu5_amd64.deb ...
Unpacking liblvm2cmd2.03:amd64 (2.03.11-2.1ubuntu5) over (2.03.11-2.1ubuntu4) ...
Preparing to unpack .../03-dmeventd_2%3a1.02.175-2.1ubuntu5_amd64.deb ...
Unpacking dmeventd (2:1.02.175-2.1ubuntu5) over (2:1.02.175-2.1ubuntu4) ...
Preparing to unpack .../04-lvm2_2.03.11-2.1ubuntu5_amd64.deb ...
Unpacking lvm2 (2.03.11-2.1ubuntu5) over (2.03.11-2.1ubuntu4) ...
Preparing to unpack .../05-libopeniscsiusr_2.1.5-1ubuntu1.1_amd64.deb ...
Unpacking libopeniscsiusr (2.1.5-1ubuntu1.1) over (2.1.5-1ubuntu1) ...
Preparing to unpack .../06-open-iscsi_2.1.5-1ubuntu1.1_amd64.deb ...
Unpacking open-iscsi (2.1.5-1ubuntu1.1) over (2.1.5-1ubuntu1) ...
Preparing to unpack .../07-distro-info-data_0.52ubuntu0.9_all.deb ...
Unpacking distro-info-data (0.52ubuntu0.9) over (0.52ubuntu0.7) ...
Preparing to unpack .../08-ubuntu-pro-client-l10n_35.1ubuntu0~22.04_amd64.deb ...
Unpacking ubuntu-pro-client-l10n (35.1ubuntu0~22.04) over (33.2~22.04) ...
Preparing to unpack .../09-ubuntu-pro-client_35.1ubuntu0~22.04_amd64.deb ...
Unpacking ubuntu-pro-client (35.1ubuntu0~22.04) over (33.2~22.04) ...

Progress: [ 28%] [######################............................................]
```

Right Ctrl

After update

File    Machine    View    Input    Devices    Help

```
[*] cron.service
[ ] dbus.service
[*] multipathd.service
[ ] networkd-dispatcher.service
[*] polkit.service
[ ] systemd-logind.service
[*] udisks2.service
[ ] unattended-upgrades.service
[ ] user@1000.service


        <Ok>              <Cancel>
```

```
 systemctl restart cron.service multipathd.service polkit.service udisks2.service
Service restarts being deferred:
 /etc/needrestart/restart.d/dbus.service
 systemctl restart networkd-dispatcher.service
 systemctl restart systemd-logind.service
 systemctl restart unattended-upgrades.service
 systemctl restart user@1000.service

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
nainam@Ubuntu:~$
```

Right Ctrl

If the CentOS virtual machine is running and this warning message appears, add the .iso file and reboot.
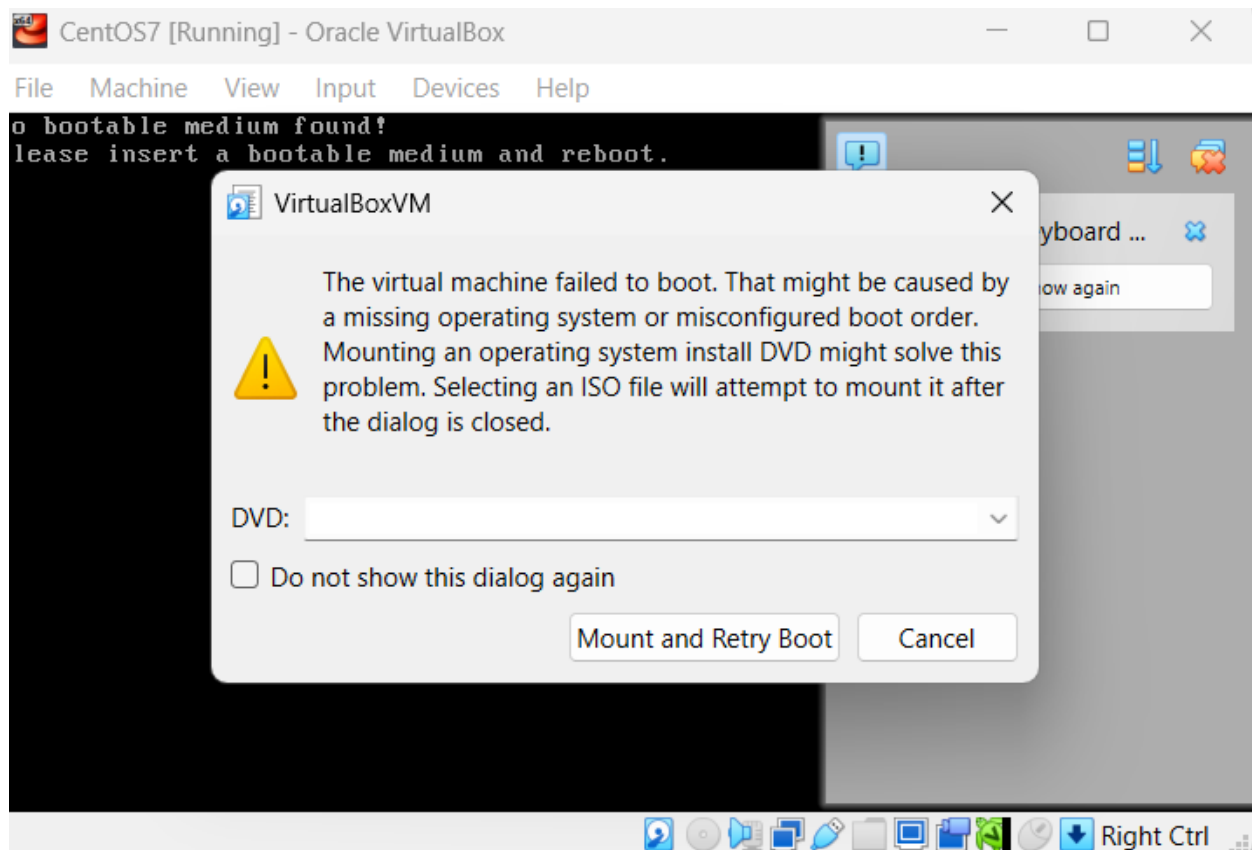


We choose the language that we need
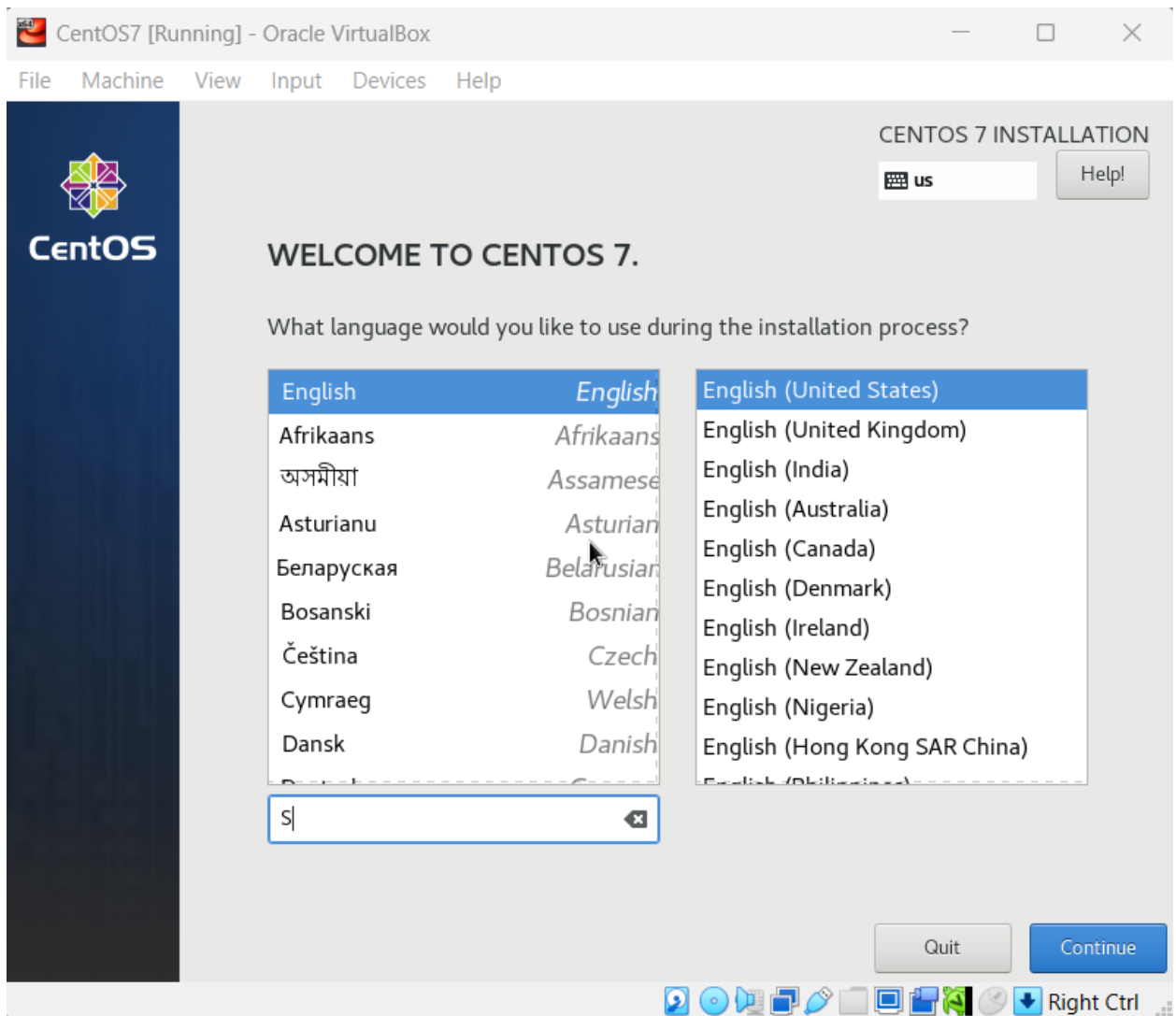
Next, we choose the disk and click Done and Begin Installation

File   Machine   View   Input   Devices   Help

## INSTALLATION SUMMARY

CENTOS 7 INSTALLATION

us

Help!

**LANGUAGE SUPPORT**
English (United States)

## SOFTWARE

**INSTALLATION SOURCE**
Local media

**SOFTWARE SELECTION**
Minimal Install

## SYSTEM

**INSTALLATION DESTINATION**
Automatic partitioning selected

**KDUMP**
Kdump is enabled

**NETWORK & HOST NAME**
Not connected

**SECURITY POLICY**
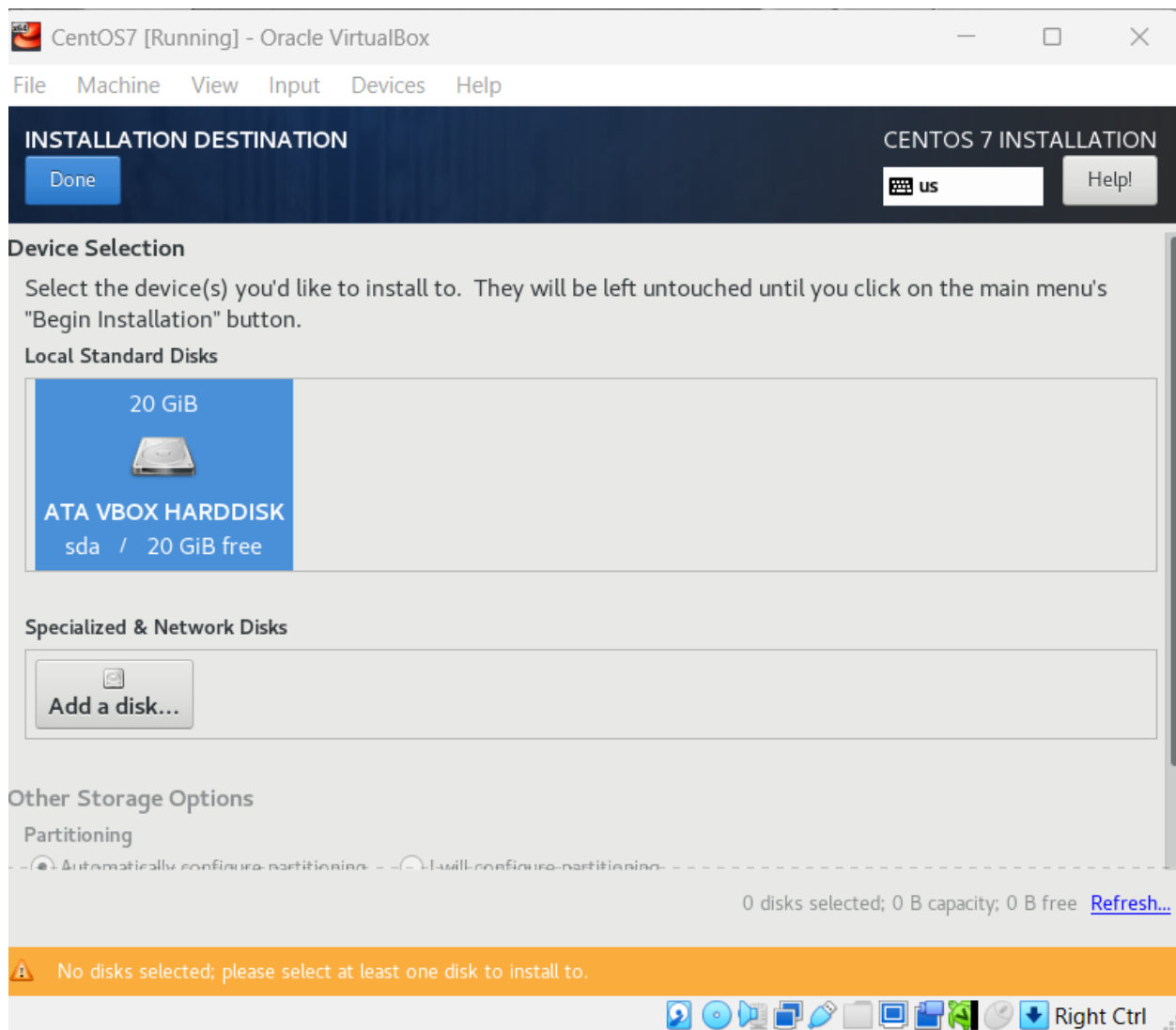No content found

Quit                    Begin Installation

*We won't touch your disks until you click 'Begin Installation'.*

⚠ Please complete items marked with this icon before continuing to the next step.
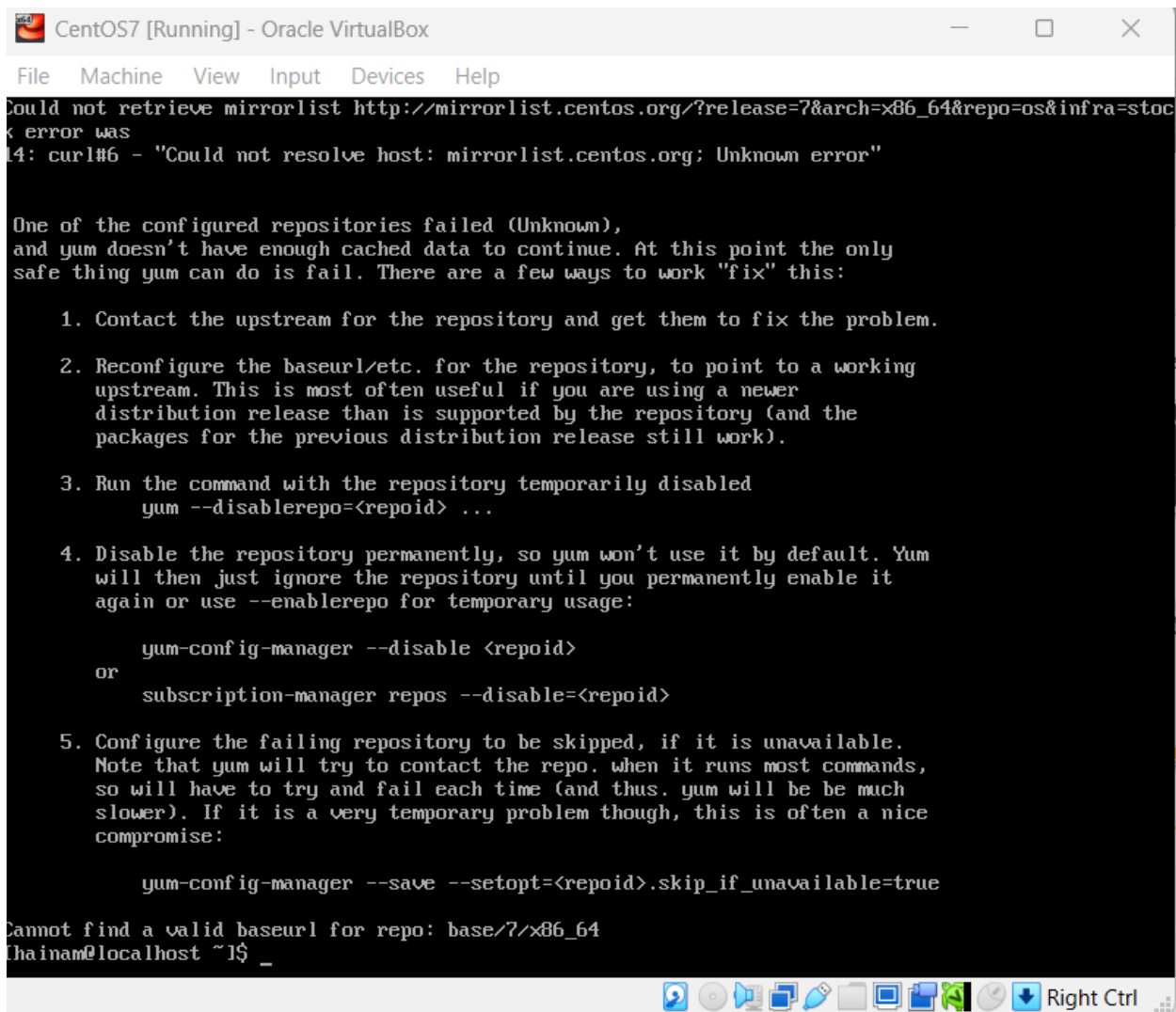
Right Ctrl

Next, we enter username, password. We must click the "Make this user administrator" to use the username and password in the virtual machine. Click 2 times to complete this step and finish installation.
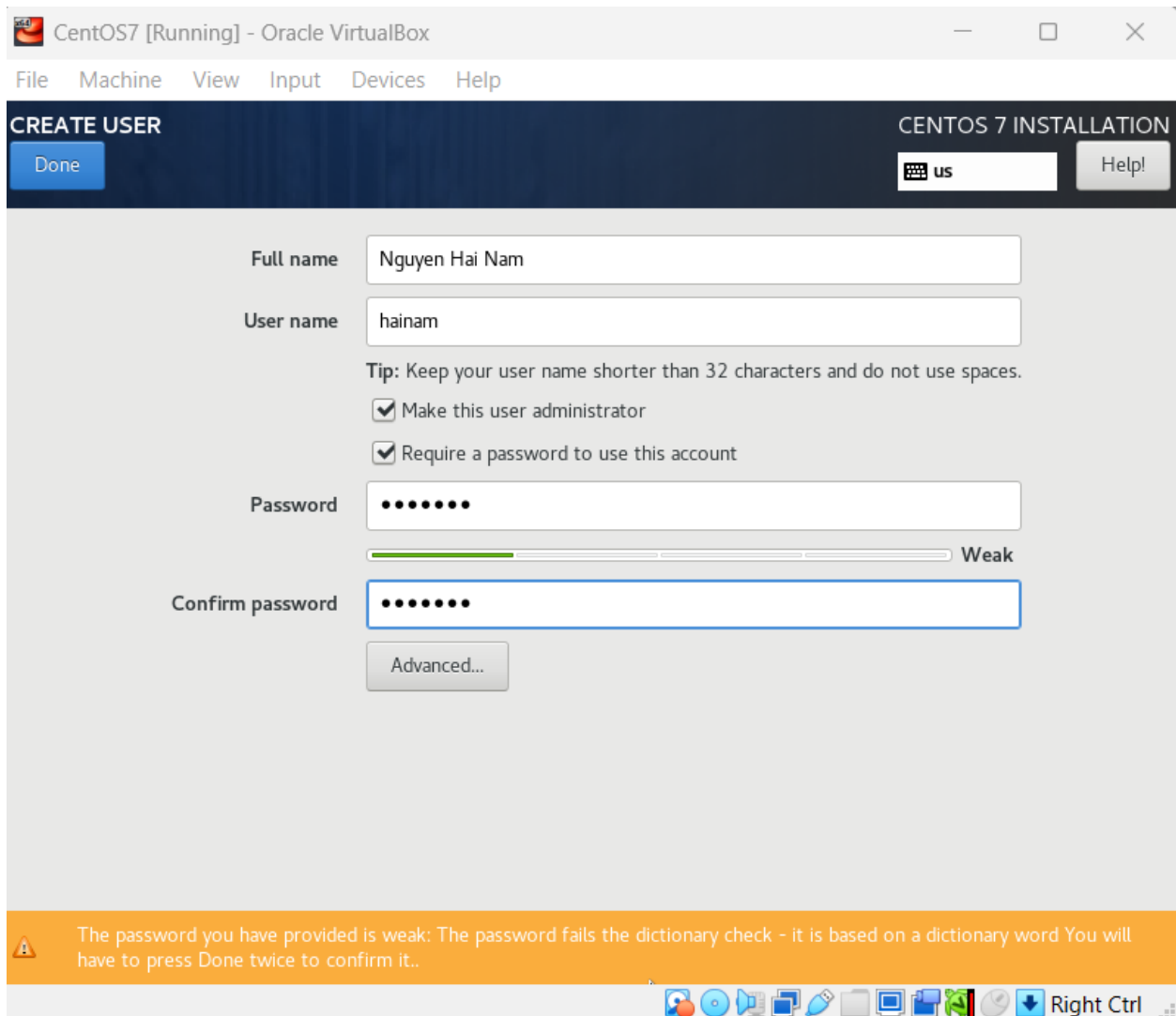
## 1.2 – Installing the EPEL repository on the Centos 7 virtual machine

In this, we check that if dhclient is permit or not, if not we use "sudo dhclient" command to permit it.

Next, we enter "sudo yum update" command. But it shows that CentOS 7 does not support anymore

So we must use another way to fix this error

Link: https://zhost.vn/tai-lieu/sua-loi-repo-sau-khi-centos-7-het-han-ho-tro-eol/

```
#
# If the mirrorlist= does not work for you, as a fall back you can try the
# remarked out baseurl= line instead.
#
#

[base]
name=CentOS-7 - Base
baseurl=http://vault.centos.org/7.9.2009/os/$basearch/
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7

#released updates
[updates]
name=CentOS-7 - Updates
baseurl=http://vault.centos.org/7.9.2009/updates/$basearch/
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7

#additional packages that may be useful
[extras]
name=CentOS-7 - Extras
baseurl=http://vault.centos.org/7.9.2009/extras/$basearch/
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7

#additional packages that extend functionality of existing packages
[centosplus]
name=CentOS-7 - Plus
baseurl=http://mirror.centos.org/7.9.2009/centosplus/$basearch/
gpgcheck=1
enabled=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7




-- INSERT --
```

After this, we can use "sudo yum update" command

```
openssh-clients           x86_64    7.4p1-23.el7_9                        updates     655 k
openssh-server            x86_64    7.4p1-23.el7_9                        updates     459 k
openssl                   x86_64    1:1.0.2k-26.el7_9                     updates     494 k
openssl-libs              x86_64    1:1.0.2k-26.el7_9                     updates     1.2 M
polkit                    x86_64    0.112-26.el7_9.1                      updates     170 k
python                    x86_64    2.7.5-94.el7_9                        updates      97 k
python-firewall           noarch    0.6.3-13.el7_9                        updates     355 k
python-libs               x86_64    2.7.5-94.el7_9                        updates     5.6 M
python-perf               x86_64    3.10.0-1160.119.1.el7                 updates     8.2 M
rpm                       x86_64    4.11.3-48.el7_9                       updates     1.2 M
rpm-build-libs            x86_64    4.11.3-48.el7_9                       updates     108 k
rpm-libs                  x86_64    4.11.3-48.el7_9                       updates     279 k
rpm-python                x86_64    4.11.3-48.el7_9                       updates      84 k
rsyslog                   x86_64    8.24.0-57.el7_9.3                     updates     622 k
selinux-policy            noarch    3.13.1-268.el7_9.2                    updates     498 k
selinux-policy-targeted   noarch    3.13.1-268.el7_9.2                    updates     7.0 M
sudo                      x86_64    1.8.23-10.el7_9.3                     updates     844 k
systemd                   x86_64    219-78.el7_9.9                        updates     5.1 M
systemd-libs              x86_64    219-78.el7_9.9                        updates     419 k
systemd-sysv              x86_64    219-78.el7_9.9                        updates      98 k
tuned                     noarch    2.11.0-12.el7_9                       updates     270 k
tzdata                    noarch    2024a-1.el7                           updates     497 k
util-linux                x86_64    2.23.2-65.el7_9.1                     updates     2.0 M
vim-minimal               x86_64    2:7.4.629-8.el7_9                     updates     443 k
virt-what                 x86_64    1.18-4.el7_9.1                        updates      30 k
wpa_supplicant            x86_64    1:2.6-12.el7_9.2                      updates     1.2 M
xz                        x86_64    5.2.2-2.el7_9                         updates     229 k
xz-libs                   x86_64    5.2.2-2.el7_9                         updates     103 k
zlib                      x86_64    1.2.7-21.el7_9                        updates      90 k

Transaction Summary
================================================================================
Install    1 Package
Upgrade  118 Packages

Total download size: 266 M
Is this ok [y/d/N]: _
```
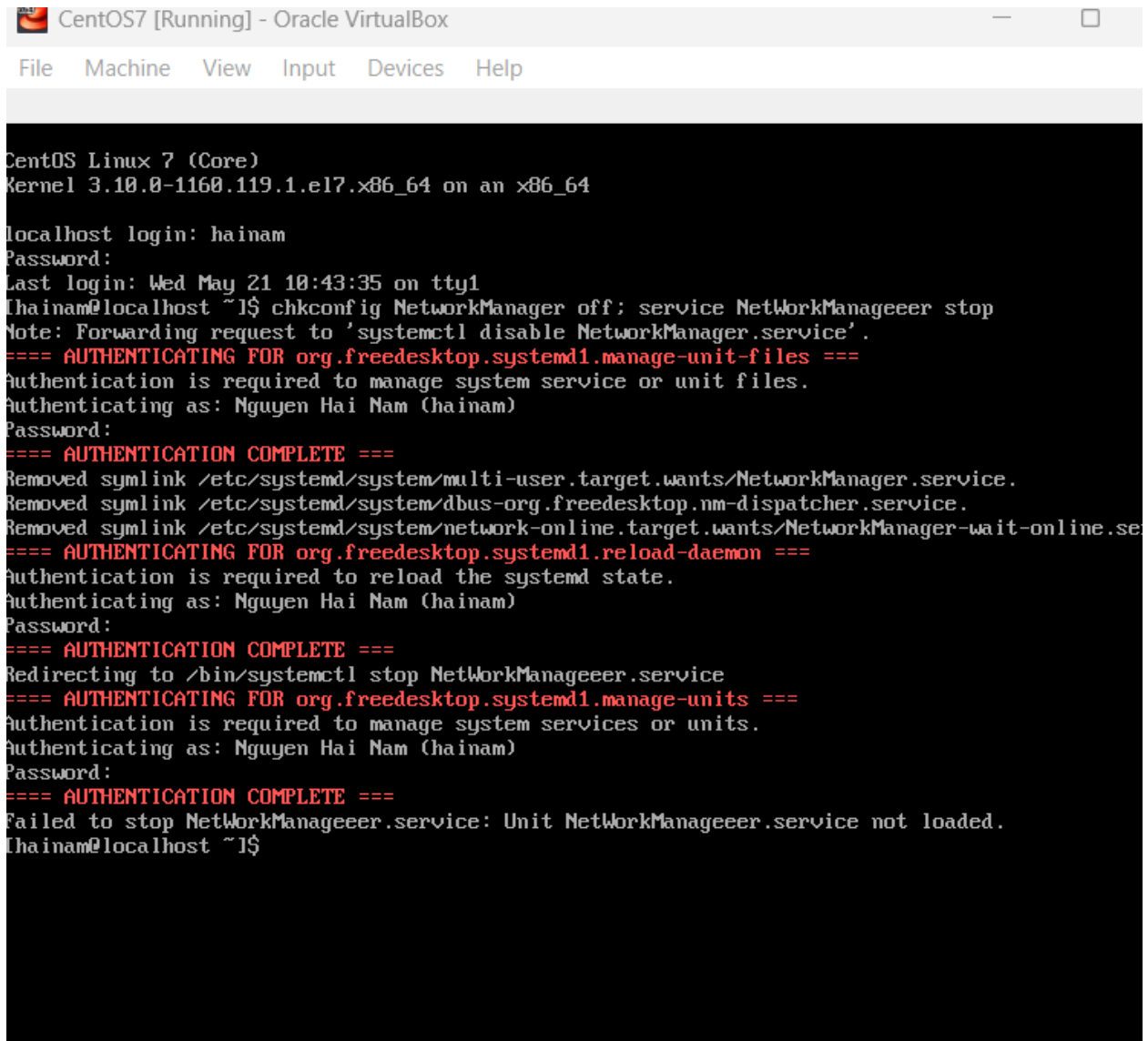
Next, we reset the virtual machine. And we fix the Network using

chkconfig NetworkManager off; service NetworkManager stop

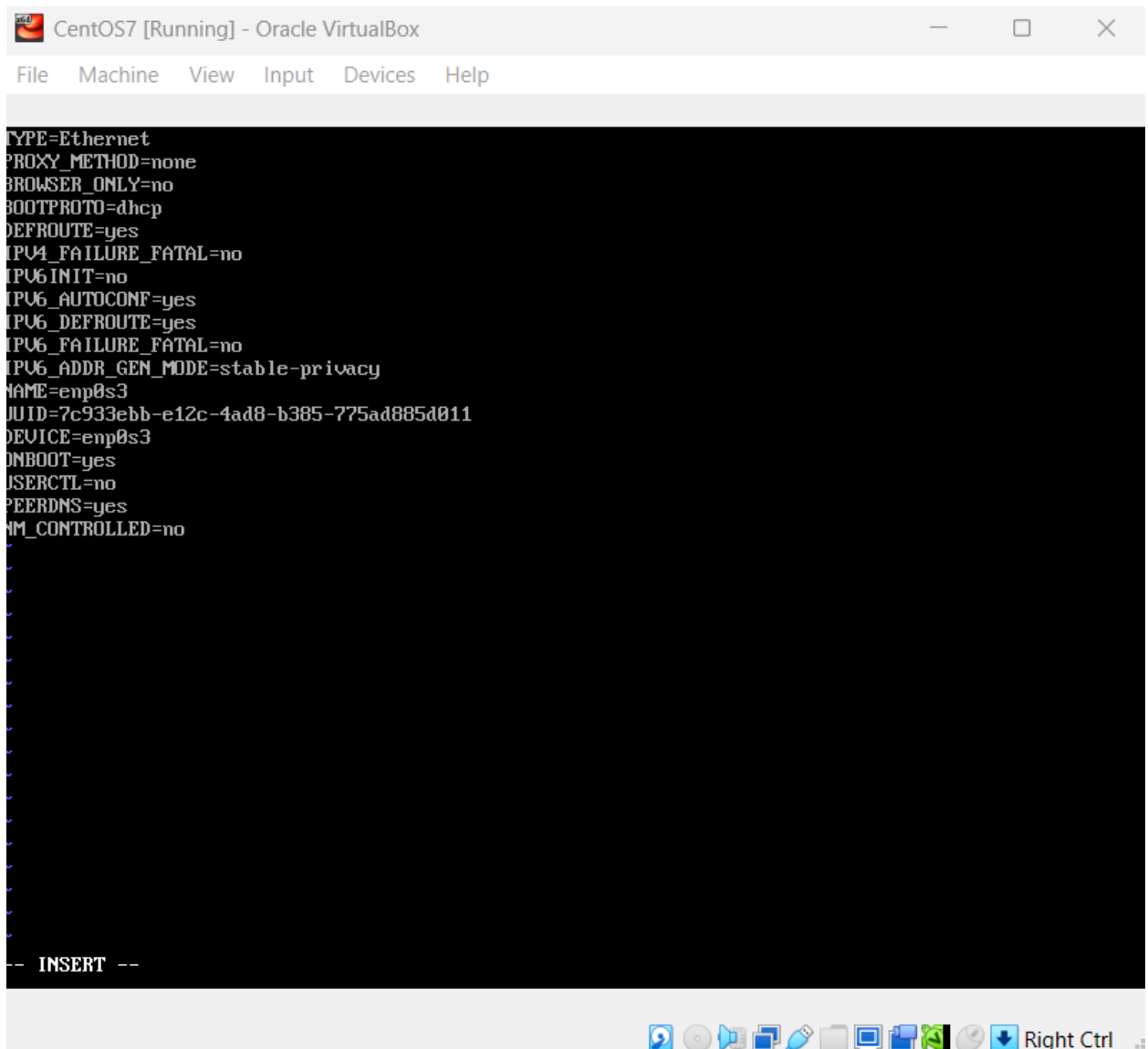sudo vi /etc/sysconfig/network-scripts/ifcfg-enp0s3



CentOS7 [Running] - Oracle VirtualBox

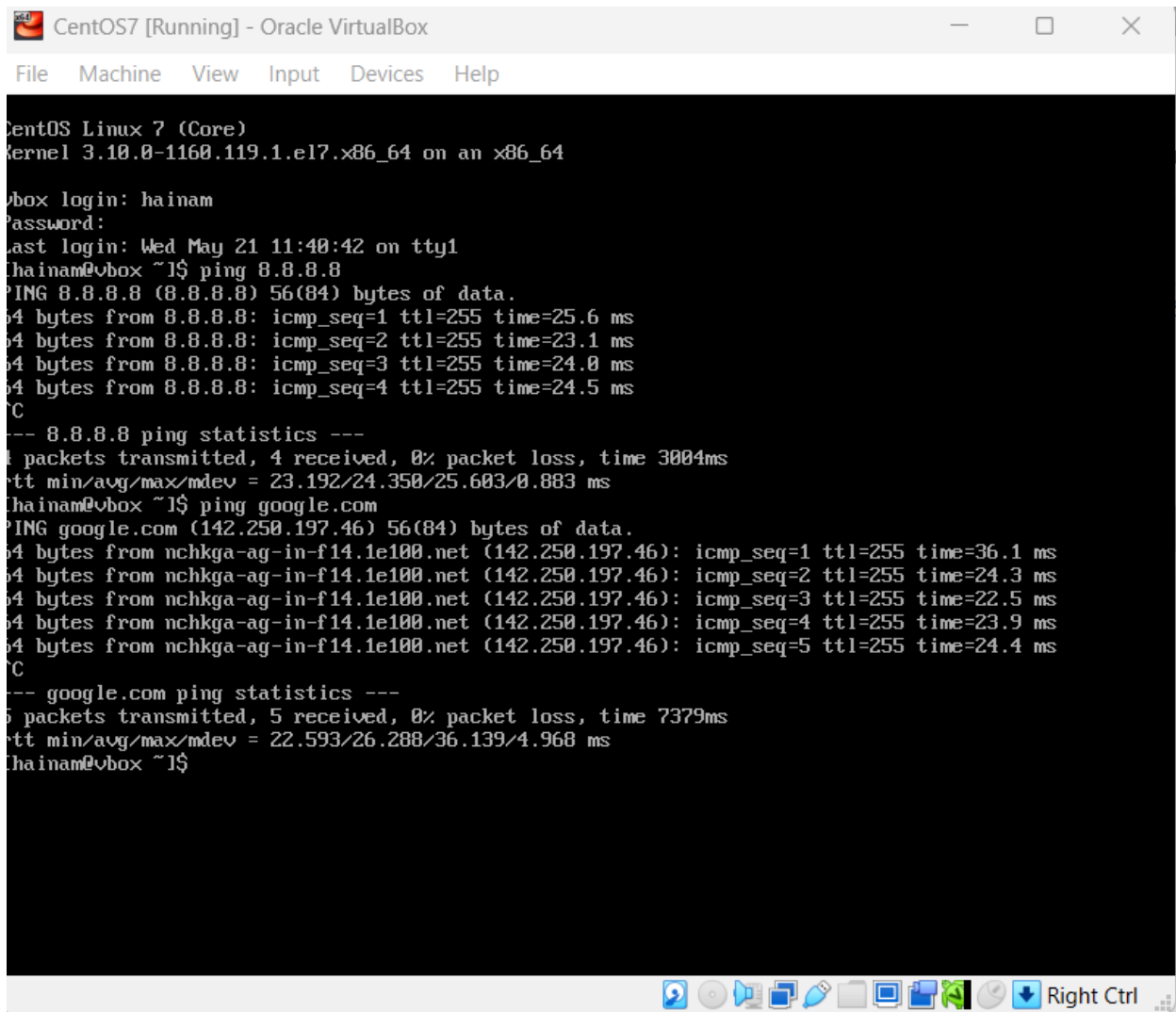File   Machine   View   Input   Devices   Help

```
CentOS Linux 7 (Core)
Kernel 3.10.0-1160.119.1.el7.x86_64 on an x86_64

localhost login: hainam
Password:
Last login: Wed May 21 10:43:35 on tty1
[hainam@localhost ~]$ chkconfig NetworkManager off; service NetWorkManageeer stop
Note: Forwarding request to 'systemctl disable NetworkManager.service'.
==== AUTHENTICATING FOR org.freedesktop.systemd1.manage-unit-files ===
Authentication is required to manage system service or unit files.
Authenticating as: Nguyen Hai Nam (hainam)
Password:
==== AUTHENTICATION COMPLETE ===
Removed symlink /etc/systemd/system/multi-user.target.wants/NetworkManager.service.
Removed symlink /etc/systemd/system/dbus-org.freedesktop.nm-dispatcher.service.
Removed symlink /etc/systemd/system/network-online.target.wants/NetworkManager-wait-online.se
==== AUTHENTICATING FOR org.freedesktop.systemd1.reload-daemon ===
Authentication is required to reload the systemd state.
Authenticating as: Nguyen Hai Nam (hainam)
Password:
==== AUTHENTICATION COMPLETE ===
Redirecting to /bin/systemctl stop NetWorkManageeer.service
==== AUTHENTICATING FOR org.freedesktop.systemd1.manage-units ===
Authentication is required to manage system services or units.
Authenticating as: Nguyen Hai Nam (hainam)
Password:
==== AUTHENTICATION COMPLETE ===
Failed to stop NetWorkManageeer.service: Unit NetWorkManageeer.service not loaded.
[hainam@localhost ~]$
```

Fix the script so that it look like in the image

```
TYPE=Ethernet
PROXY_METHOD=none
BROWSER_ONLY=no
BOOTPROTO=dhcp
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=no
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_FAILURE_FATAL=no
IPV6_ADDR_GEN_MODE=stable-privacy
NAME=enp0s3
UUID=7c933ebb-e12c-4ad8-b385-775ad885d011
DEVICE=enp0s3
ONBOOT=yes
USERCTL=no
PEERDNS=yes
NM_CONTROLLED=no



-- INSERT --
```

Reset the machine and check the network by ping  8.8.8.8 and ping google.com

Now we can take the next step

sudo yum install yum-plugin-priorities epel-release
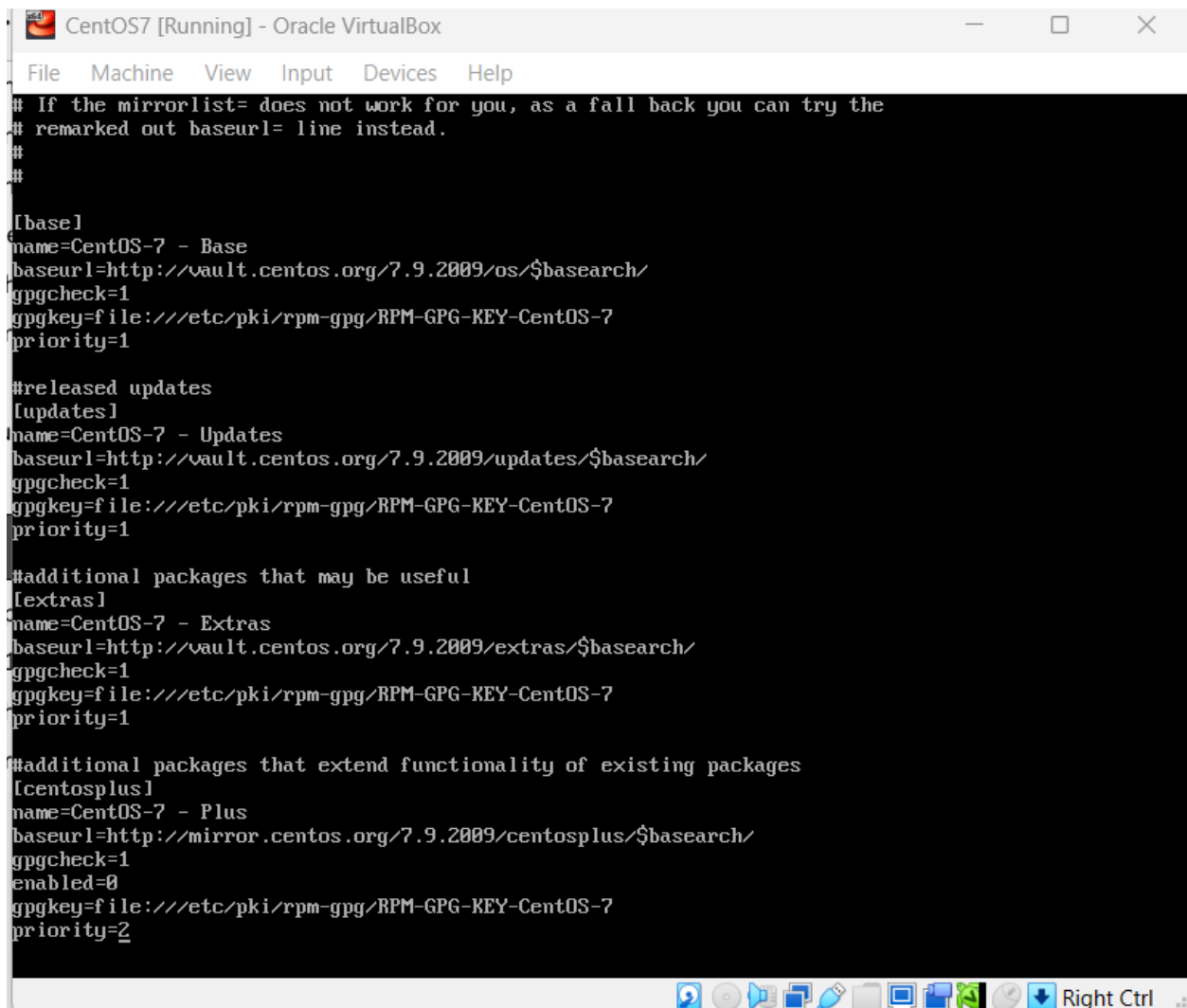
Enter command "sudo vi /etc/yum.repos.d/CentOS-Base.repo" and fix the script like the exercise command
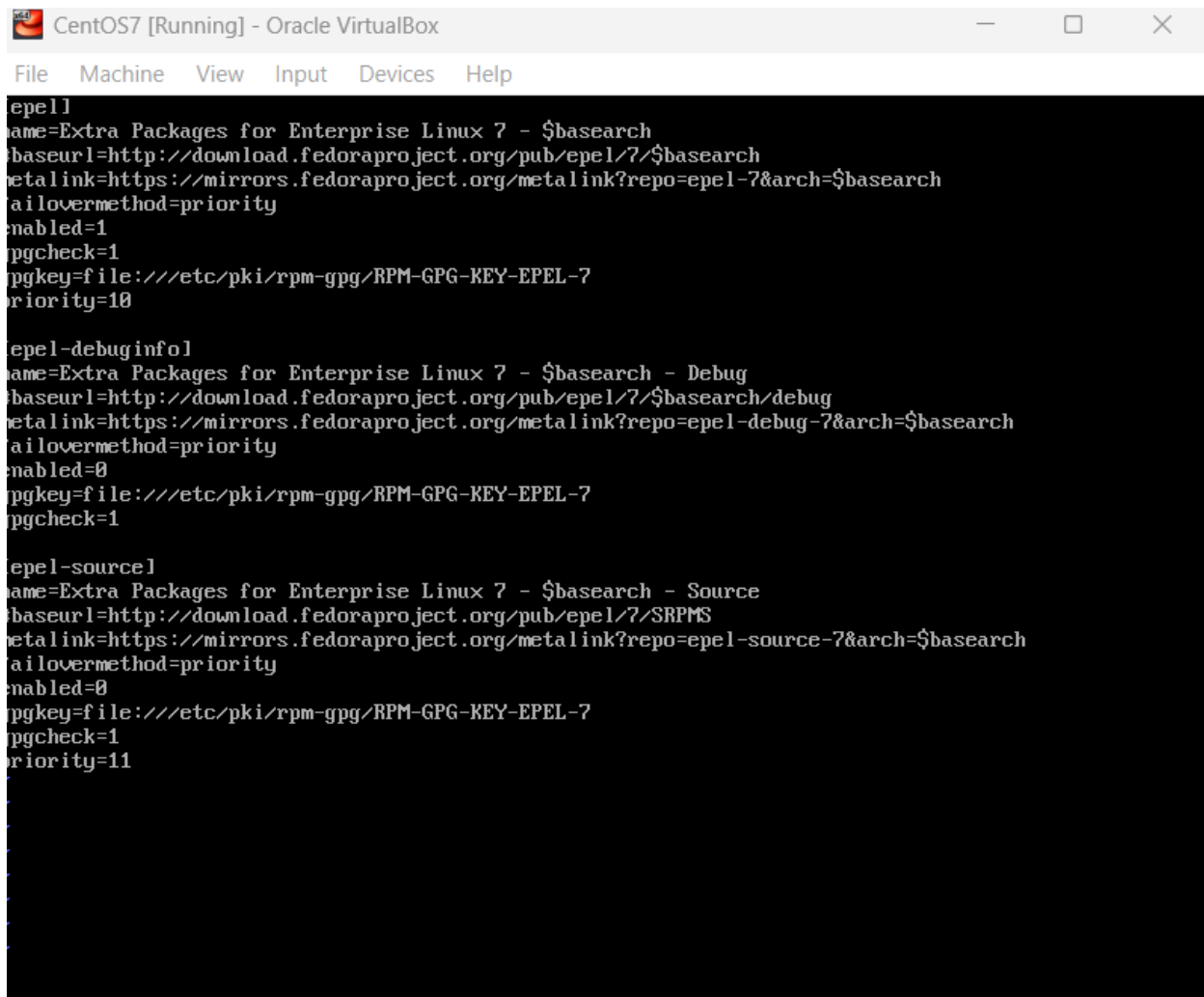
```
# If the mirrorlist= does not work for you, as a fall back you can try the
# remarked out baseurl= line instead.
#
#

[base]
name=CentOS-7 - Base
baseurl=http://vault.centos.org/7.9.2009/os/$basearch/
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
priority=1

#released updates
[updates]
name=CentOS-7 - Updates
baseurl=http://vault.centos.org/7.9.2009/updates/$basearch/
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
priority=1

#additional packages that may be useful
[extras]
name=CentOS-7 - Extras
baseurl=http://vault.centos.org/7.9.2009/extras/$basearch/
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
priority=1

#additional packages that extend functionality of existing packages
[centosplus]
name=CentOS-7 - Plus
baseurl=http://mirror.centos.org/7.9.2009/centosplus/$basearch/
gpgcheck=1
enabled=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
priority=2
```

Next, we enter "sudo vi /etc/yum.repos.d/epel.repo" and fix the script like the exercise command

```
epel]
ame=Extra Packages for Enterprise Linux 7 - $basearch
baseurl=http://download.fedoraproject.org/pub/epel/7/$basearch
metalink=https://mirrors.fedoraproject.org/metalink?repo=epel-7&arch=$basearch
ailovermethod=priority
nabled=1
pgcheck=1
pgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-7
riority=10

epel-debuginfo]
ame=Extra Packages for Enterprise Linux 7 - $basearch - Debug
baseurl=http://download.fedoraproject.org/pub/epel/7/$basearch/debug
metalink=https://mirrors.fedoraproject.org/metalink?repo=epel-debug-7&arch=$basearch
ailovermethod=priority
nabled=0
pgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-7
pgcheck=1

epel-source]
ame=Extra Packages for Enterprise Linux 7 - $basearch - Source
baseurl=http://download.fedoraproject.org/pub/epel/7/SRPMS
metalink=https://mirrors.fedoraproject.org/metalink?repo=epel-source-7&arch=$basearch
ailovermethod=priority
nabled=0
pgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-7
pgcheck=1
riority=11
```

Update the system and then create a list of the installed and available packages by running the following commands

sudo yum upgrade

sudo yum list > yum_list.txt

```
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-7
gpgcheck=1

[epel-source]
name=Extra Packages for Enterprise Linux 7 - $basearch - Source
#baseurl=http://download.fedoraproject.org/pub/epel/7/SRPMS
metalink=https://mirrors.fedoraproject.org/metalink?repo=epel-source-7&arch=$basearch
failovermethod=priority
enabled=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-7
gpgcheck=1
priority=11
~
~
~
~
~
~
~
"/etc/yum.repos.d/epel.repo" 28L, 975C written
[hainam@vbox ~]$ sudo yum upgrade -y && sudo yum list > yum_list.txt
[sudo] password for hainam:
Loaded plugins: fastestmirror, priorities
Loading mirror speeds from cached hostfile
epel/x86_64/metalink                                         | 5.1 kB  00:00:00
 * epel: d2lzkl7pfhq30w.cloudfront.net
base                                                         | 3.6 kB  00:00:00
epel                                                         | 4.3 kB  00:00:00
extras                                                       | 2.9 kB  00:00:00
updates                                                      | 2.9 kB  00:00:00
(1/3): epel/x86_64/group                                     | 399 kB  00:00:00
(2/3): epel/x86_64/updateinfo                                | 1.0 MB  00:00:01
(3/3): epel/x86_64/primary_db                                | 8.7 MB  00:00:02
129 packages excluded due to repository priority protections
No packages marked for update
[hainam@vbox ~]$ _
```
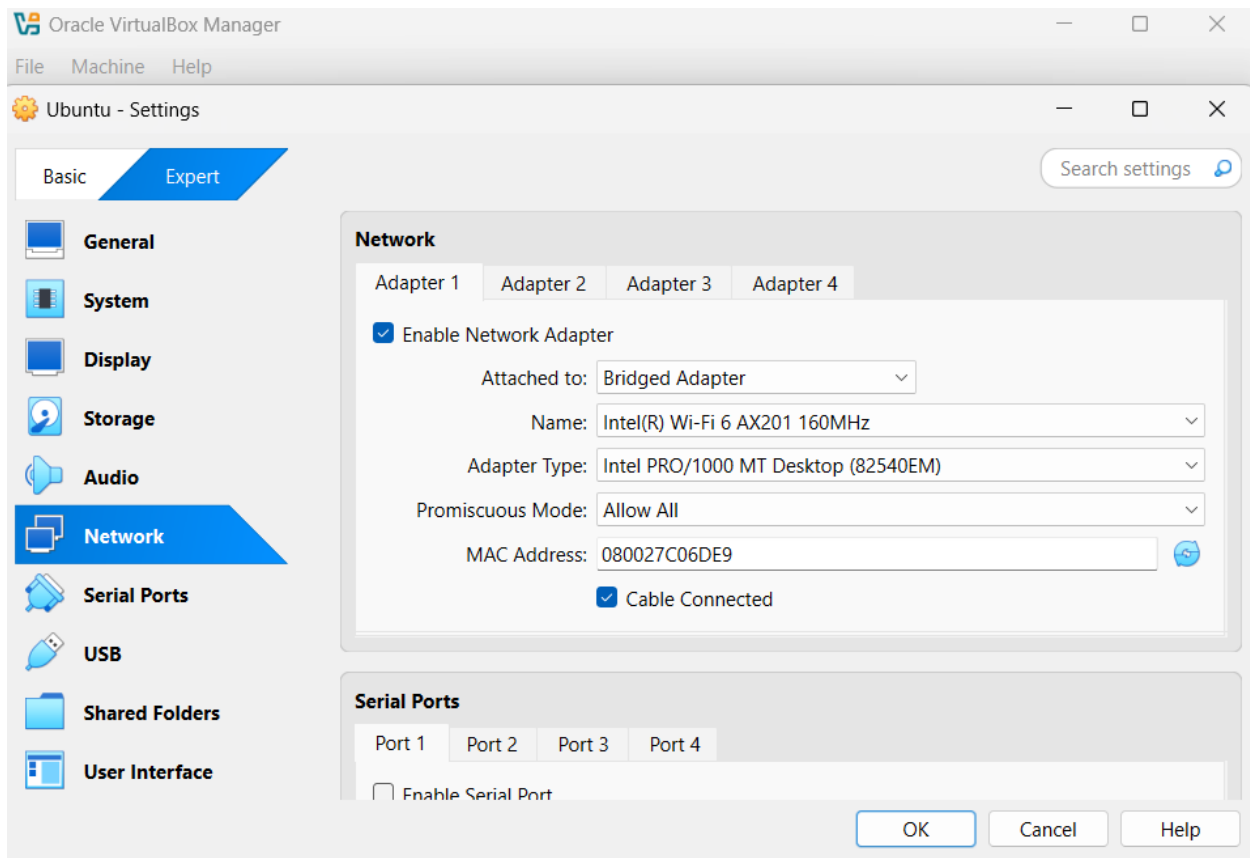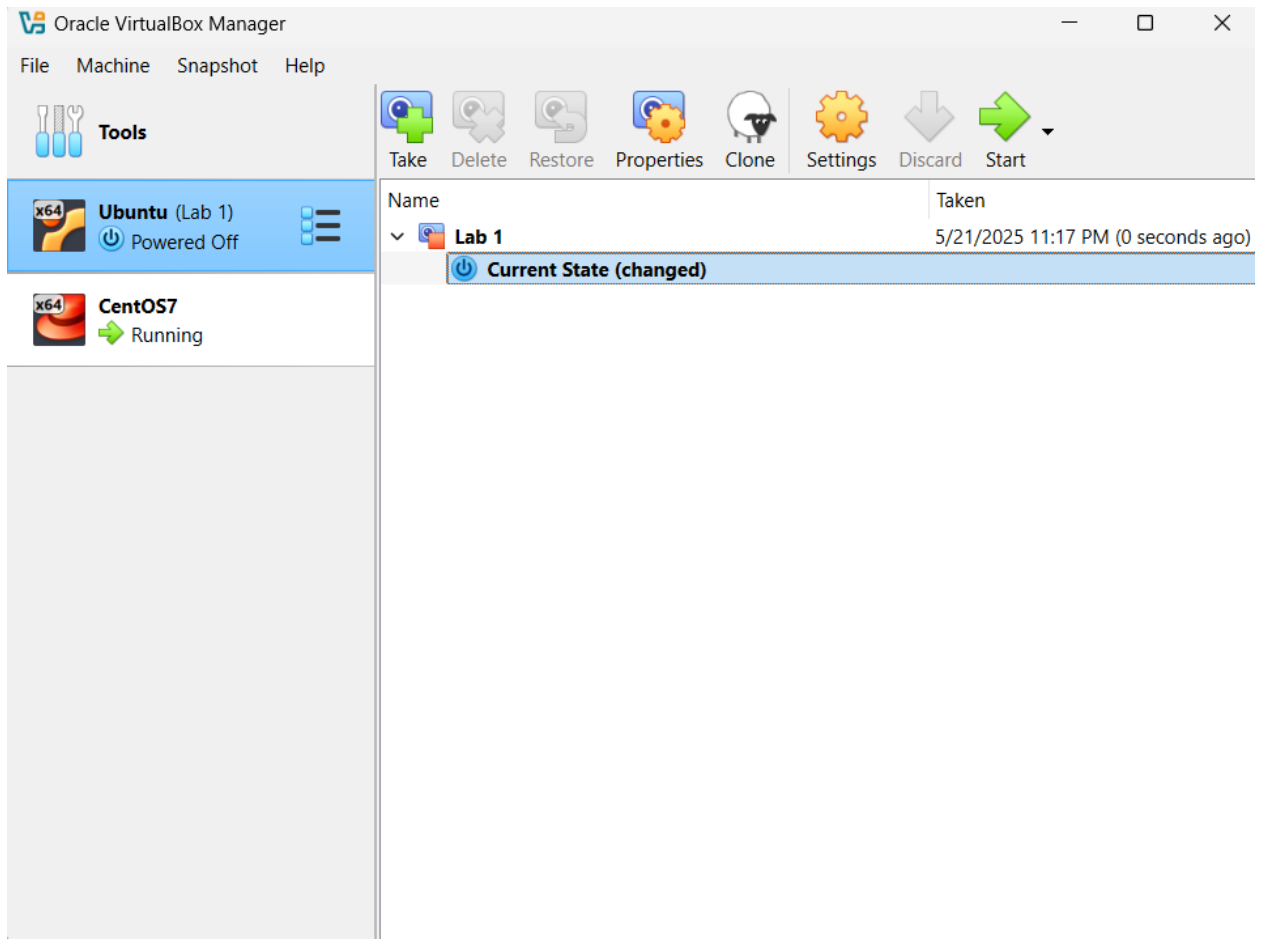
## 1.3 – Configuring a network for VirtualBox virtual machines

We change the Ubuntu network from NAT to Bridge Adapter, and change the Promiscuous Mode setting to Allow All

## Oracle VirtualBox Manager

File   Machine   Help

## Ubuntu - Settings

Basic | Expert

Search settings

### Network

| Adapter 1 | Adapter 2 | Adapter 3 | Adapter 4 |

- General
- System
- Display
- Storage
- Audio
- **Network**
- Serial Ports
- USB
- Shared Folders
- User Interface

☑ Enable Network Adapter

Attached to: Bridged Adapter

Name: Intel(R) Wi-Fi 6 AX201 160MHz

Adapter Type: Intel PRO/1000 MT Desktop (82540EM)

Promiscuous Mode: Allow All

MAC Address: 080027C06DE9

☑ Cable Connected

### Serial Ports

| Port 1 | Port 2 | Port 3 | Port 4 |

☐ Enable Serial Port

OK | Cancel | Help

## 1.4 – Creating a virtual machine snapshot with VirtualBox



## 1.5 – Using the Windows SSH client to interface with Linux virtual machines

Use Terminal in Window

Open CentOS virtual machine, install net-tool using yum

sudo yum install net-tools -y

Type ifconfig to check the ip of the CentOS virtual machine

Then, just type in the SSH commands the same as you would from a Linux machine, like this:

Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\Asus> ssh hainam@192.168.1.199
The authenticity of host '192.168.1.199 (192.168.1.199)' can't be established.
ED25519 key fingerprint is SHA256:uWTLxnzeU8y2aBNL58bV4MmxeHpDUHe/2jL/nDZ4p5A.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.1.199' (ED25519) to the list of known hosts.
hainam@192.168.1.199's password:
Last login: Wed May 21 12:32:51 2025
[hainam@localhost ~]$

Ubuntu (Lab 1) [Running] - Oracle VirtualBox

File  Machine  View  Input  Devices  Help

hainam@Ubuntu:~$ 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: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 100
0
    link/ether 08:00:27:c0:6d:e9 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.129/24 metric 100 brd 192.168.1.255 scope global dynamic enp0s3
       valid_lft 86384sec preferred_lft 86384sec
    inet6 2405:4802:1cdc:1490:ffff:ffff:ffff:ffd2/128 scope global dynamic noprefixroute
       valid_lft 105sec preferred_lft 45sec
    inet6 2405:4802:1cdc:1490:a00:27ff:fec0:6de9/64 scope global dynamic mngtmpaddr noprefixroute
       valid_lft 17984sec preferred_lft 17984sec
    inet6 fe80::a00:27ff:fec0:6de9/64 scope link
       valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 08:00:27:a2:4e:d2 brd ff:ff:ff:ff:ff:ff
hainam@Ubuntu:~$

Right Ctrl