LINUX

HOW TO INSTALL

SESSION - 2

Session 2 – Agenda

- Basic Components of Linux OS
- How to Install Linux in a VM
- Explore installation type

- Time – 1.5 hrs

Basic Components of Linux

- Boot Loader
- Kernel
- File system
- Shell
- Desktop Environments
- Daemons
- Graphical Server

Boot Loader

- A Boot Loader is a small program that helps to load an OS into memory. It is stored in either MBR or GUID partition table without a boot loader, your OS can not be loaded into memory.
- A bootloader is the first software that runs when a computer starts. It loads the kernel of the operating system and then the kernel initializes the rest of the operating system: shell, display manager, desktop environment, etc.

GRUB (Grand Unified Bootloader)

- GRUB is developed and maintained by the GNU project.
- Supports passwords with encryption for security.
- Enabled Multi-Booting
- Latest version of GNU GRUB is GRUB2

Linux Loader (L ILO)

- LILO was the default boot loader for most Linux distributions in early days.
- No Multi-Booting
- It doesn’t offer an interactive CLI

File System

- Linux supports various file systems like Ext2, Ext3, Ext4, XFS, BtrFS, GlusterFS.
- A file system is the way in which files are named, stored, retrieved as well as updated on a storage disk or partition; the way files are organized on the disk.
- The default file system in RHEL7 is XFS which is highy scalable with high performance.

SHELL

- The interface that accepts user input and produces output is called a shell.
- BASH is the default shell on many Linux distributions
- BASH belongs to "character-based user interface". The other type of interface like the GUI (Graphical User Interface), accepts not only text based input, but also mouse movements, or even finger touches and gestures like in smartphones and other touch screens.
- BASH can operate in two modes

1. The interactive mode (writing commands directly to the shell)
2. Programming mode (writing shell scripts)

BASH Origins

- shell is an independent program of the underlying OS (UNIX or Linux), many number of shells were created since the introduction of UNIX.
- The most popular was the Bourne shell (sh), created by Steven Bourne. It was included in the very first editions of UNIX. It is still used and popular till now .
- Later the c-shell (csh). It bears its name from the resemblance between its commands and the ones used in the c programming language, which was aimed at making it easier for c programmers to learn UNIX shells.
- Kornshell (ksh) - It has the best features of both Bourne and C shells.
- The Bourne-Again shell (BASH), GNU (short for GNU's Not UNIX) is a project that targeted at providing free alternatives to the UNIX OS. The most important product was Linux.

Commands for SHELL

know your current shell using this command

[root@iopex.com ~]# echo $SHELL

Output: /bin/bash

Know the list of shells you could access using this command

[root@iopex.com ~]$ cat /etc/shells #(or) chsh –l

Output: /bin/sh

/bin/bash

/sbin/nologin

/usr/bin/sh

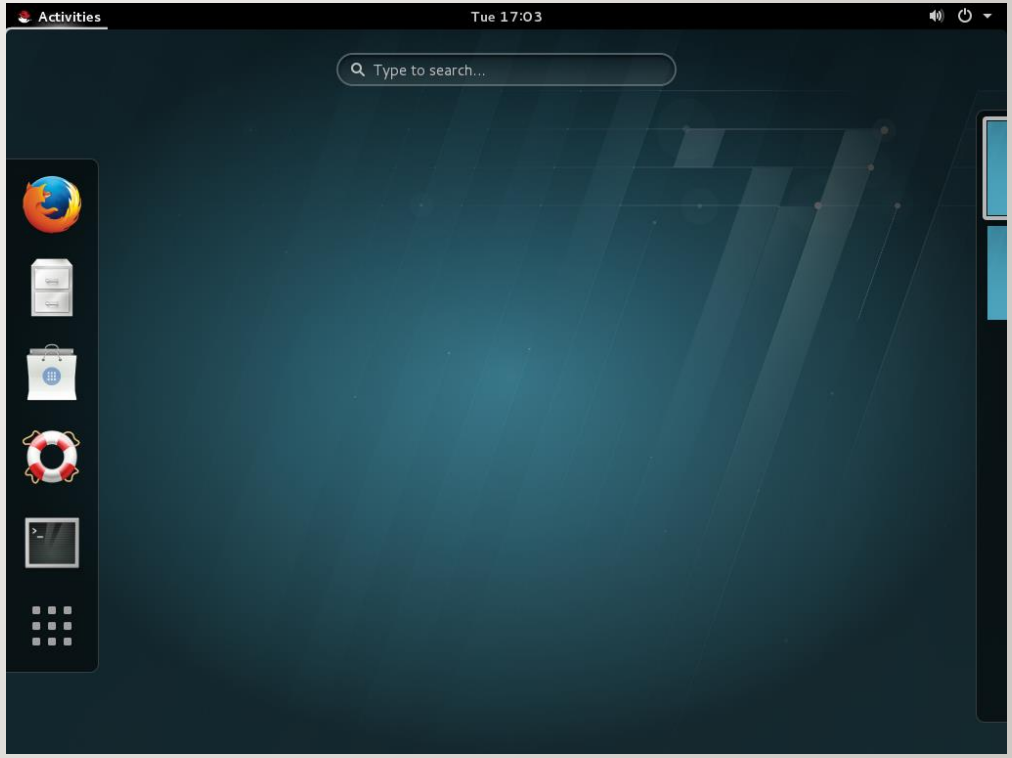
/usr/bin/bash

/usr/sbin/nologin

Desktop Environments

- A desktop environment is the bundle of components that provide you common graphical user interface (GUI) elements such as icons, toolbars, wallpapers, and desktop widgets. ...Without a desktop environment, your Linux system will just have a terminal like utility and you'll have to interact it using commands only.

A GNOME 3 desktop look like this



DAEMONS and GRAPHICAL SERVER

- A Daemon is a service process that runs in the background and supervises the system or provides functionality to other processes.
- All Daemons have names that end with ‘d’

  example: crond, dhcpd, systemd, httpd, etc.,
- systemd is a linux service manager which provides the ability to manage and control services.

GRAPHICAL SERVER

- In Linux we have a graphical user called “X” or “X-server”.
- We can’t directly interact with the graphical server.

Installation of Linux (RHEL 7)

Requirements are:

- A computer with 4GB RAM, 256GB HDD which supports Virtualization (Minimum)
- ISO image file of RHEL 7 version
- Oracle VM Box or Vmware

Note: In this session we are using Oracle Virtual Box a freeware.

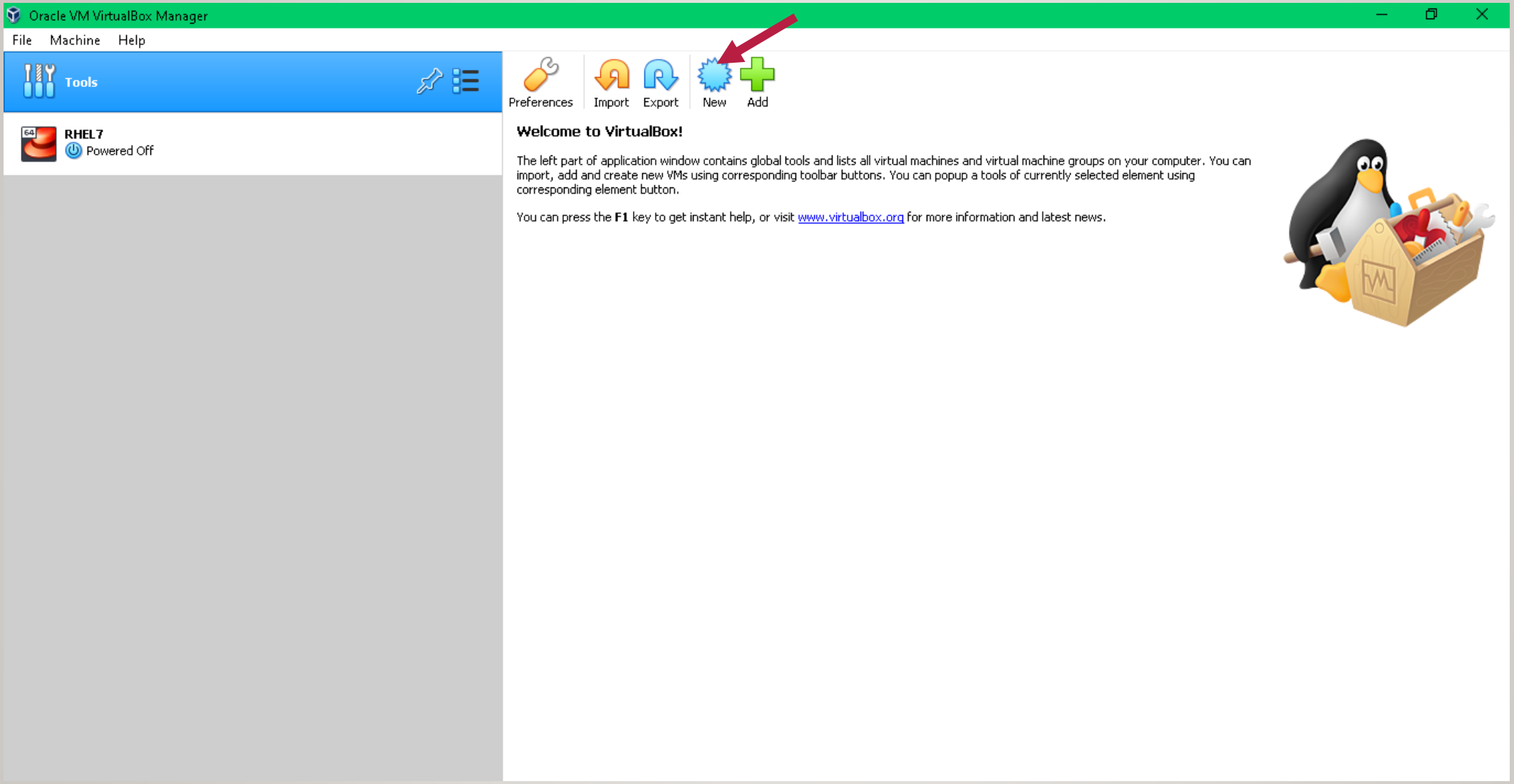
NOTE:

- Before Installation we need to do some basic configuration in your Virtual Machine (VM).
- Incase if you are using a physical machine for installation you scan skip first "10" steps mentioned.
- Installing Red Hat Enterprise Server (RHEL) will be similar to CentOS installation.
- Keep patience while completing installation, a small mistake can cause Re-Installation of OS.
- Get your Virtual Box installed and ready to use

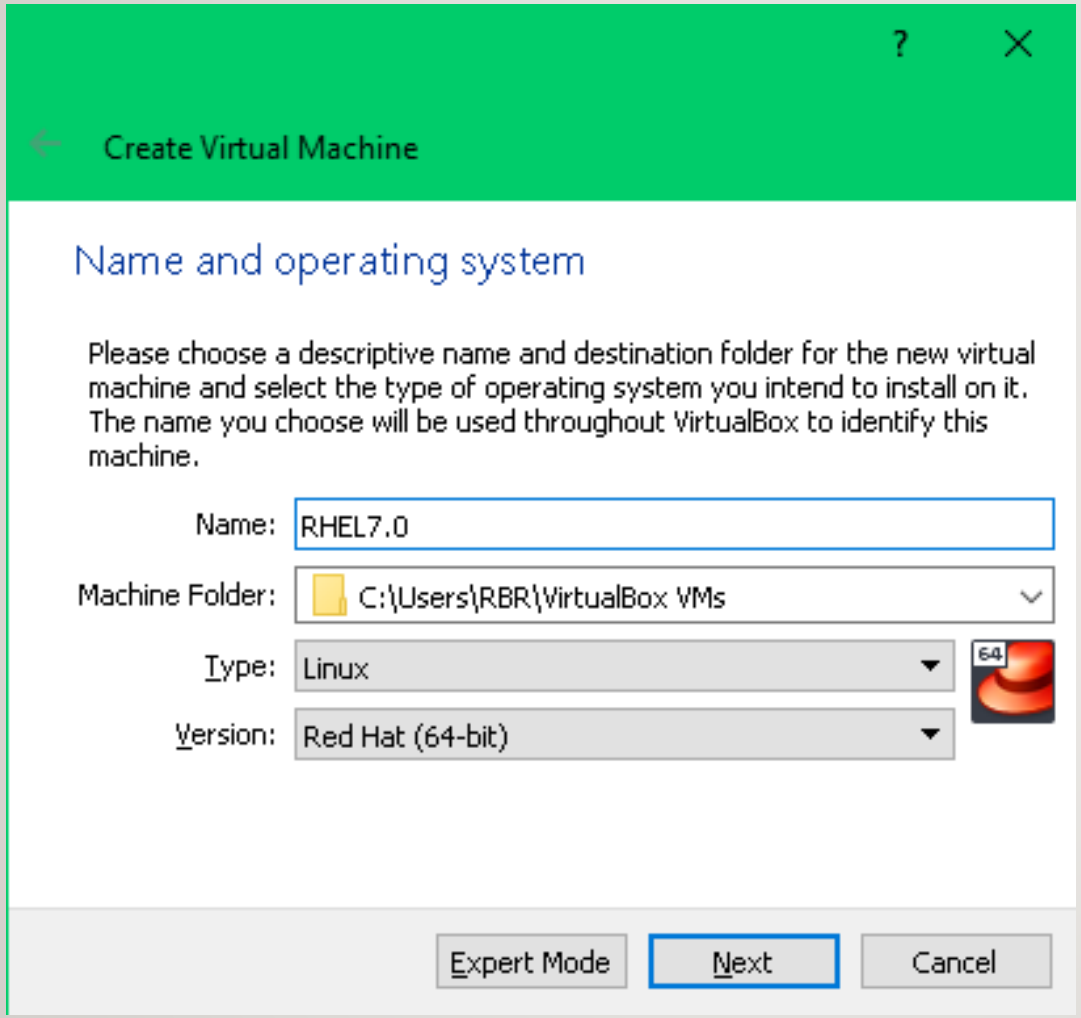
Download link for Oracle VM Box:

https://www.virtualbox.org/wiki/Downloads

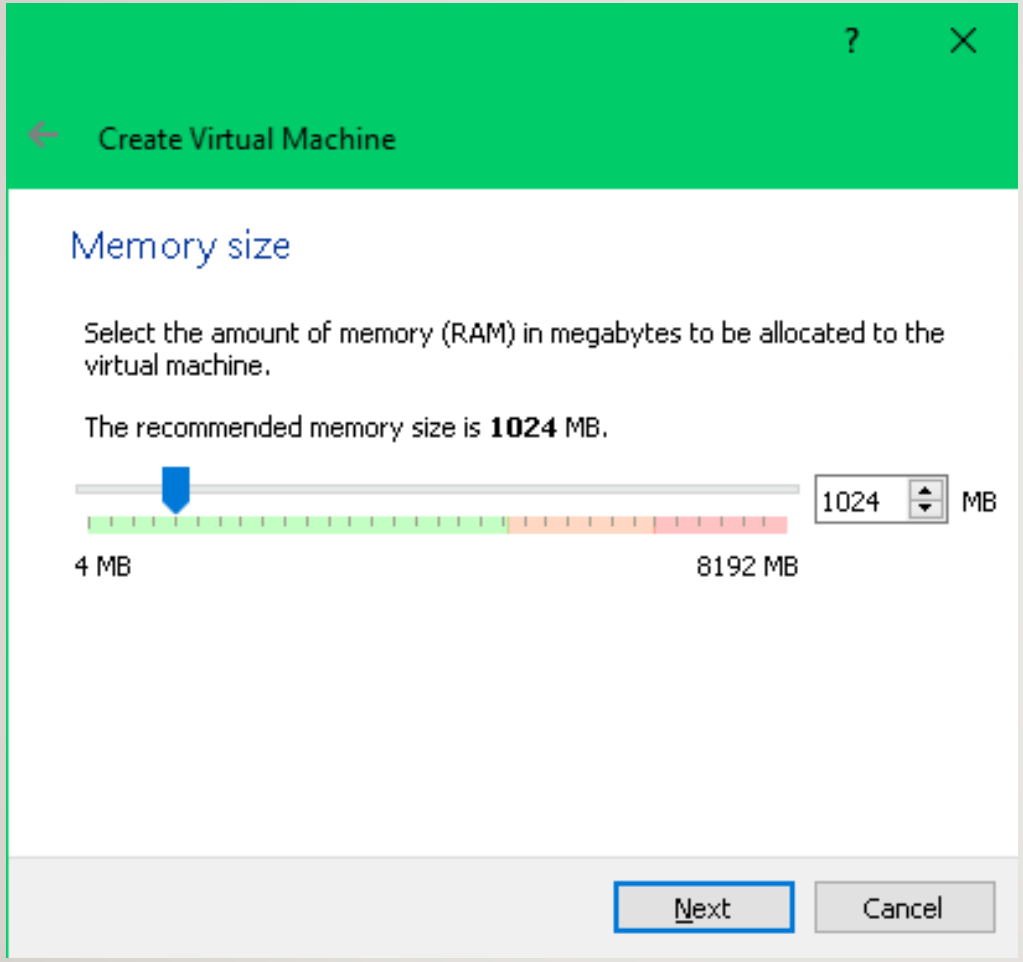
- Step 1:


Oracle VM VirtualBox Manager
File
Machine
Help
Tools
RHEL7
Powered Off
Preferences
Import
Export
New
Add
Welcome to VirtualBox!
The left part of application window contains global tools and lists all virtual machines and virtual machine groups on your computer. You can import, add and create new VMs using corresponding toolbar buttons. You can popup a tools of currently selected element using corresponding element button.
You can press the F1 key to get instant help, or visit www.virtualbox.org for more information and latest news.

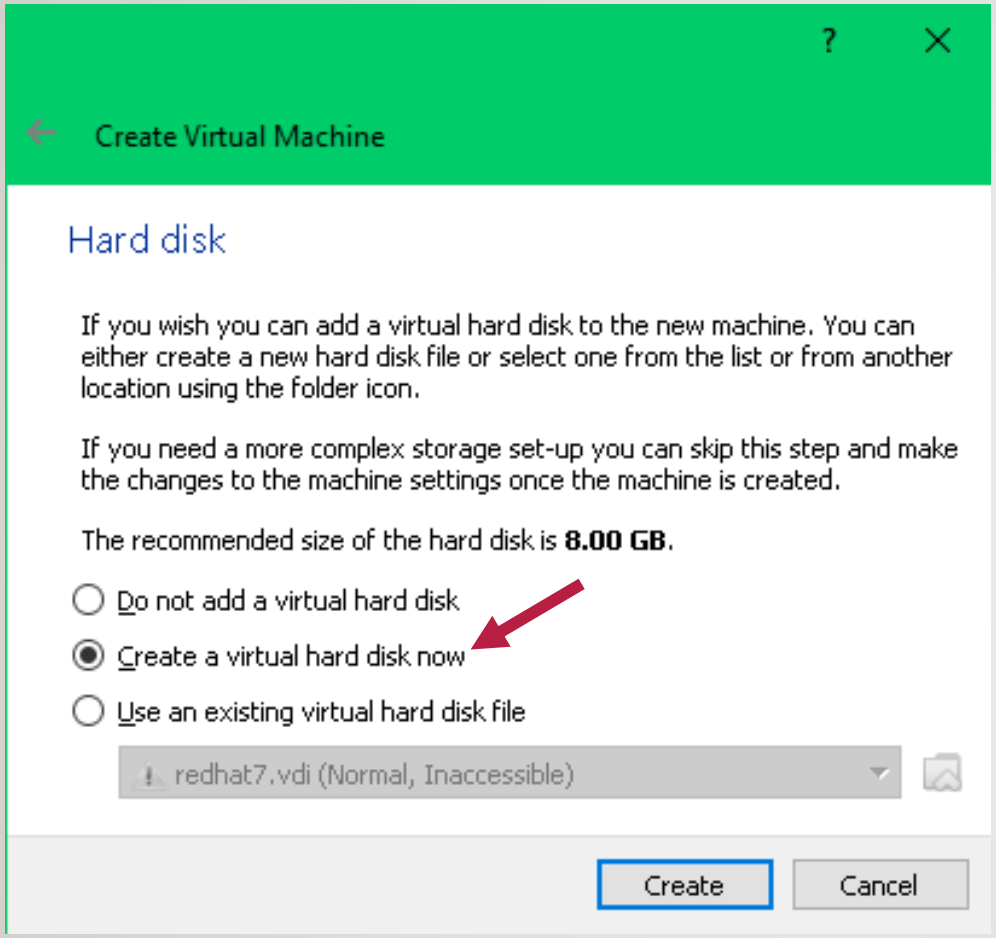
- Step 2:


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:
RHEL7.0
Machine Folder:
C:\Users\RBR\VirtualBox VMs
Type:
Linux
Version:
Red Hat (64-bit)
Expert Mode
Next
Cancel

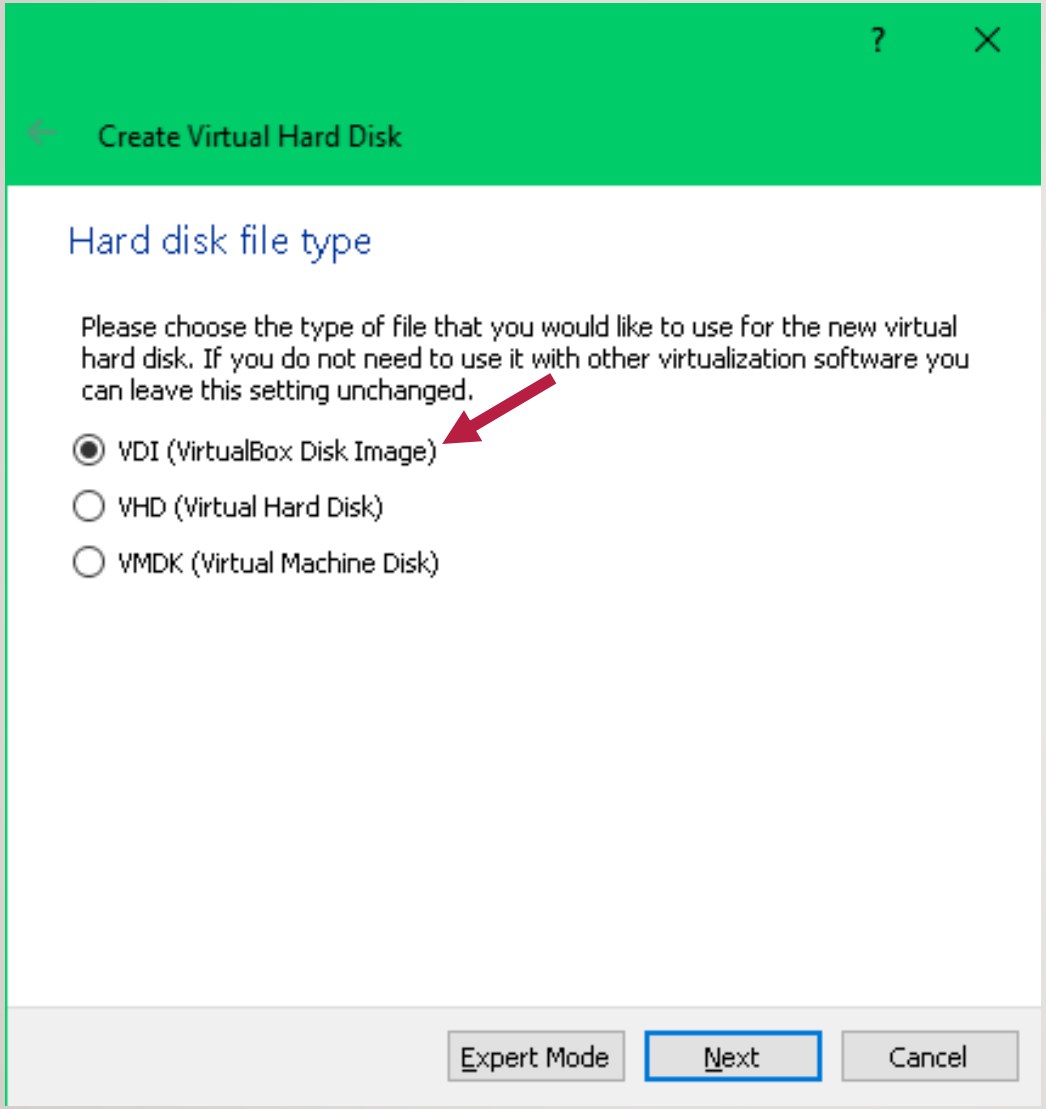
- Step 3:


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.
1024
MB
4 MB
8192 MB
Next
Cancel

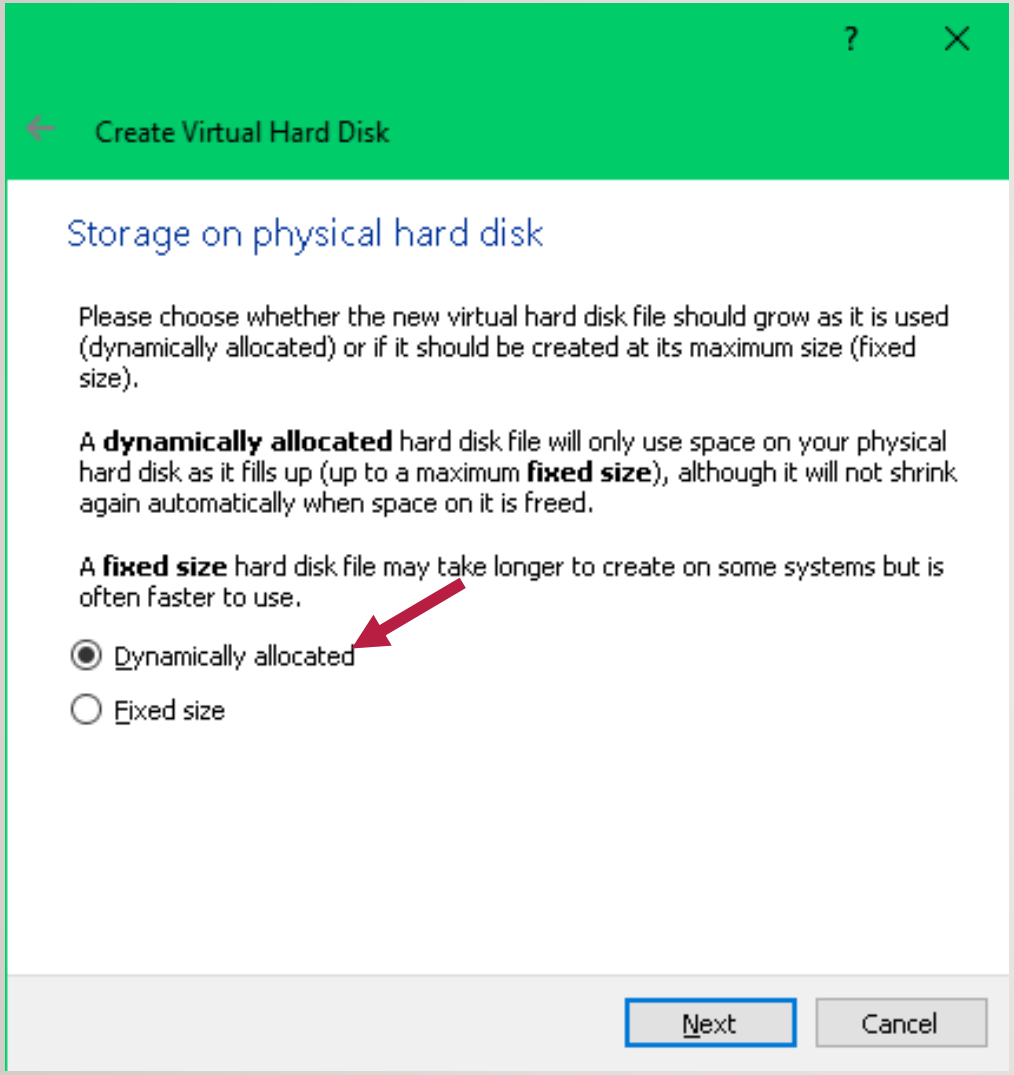
- Step 4:


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
redhat7.vdi (Normal, Inaccessible)
Create
Cancel

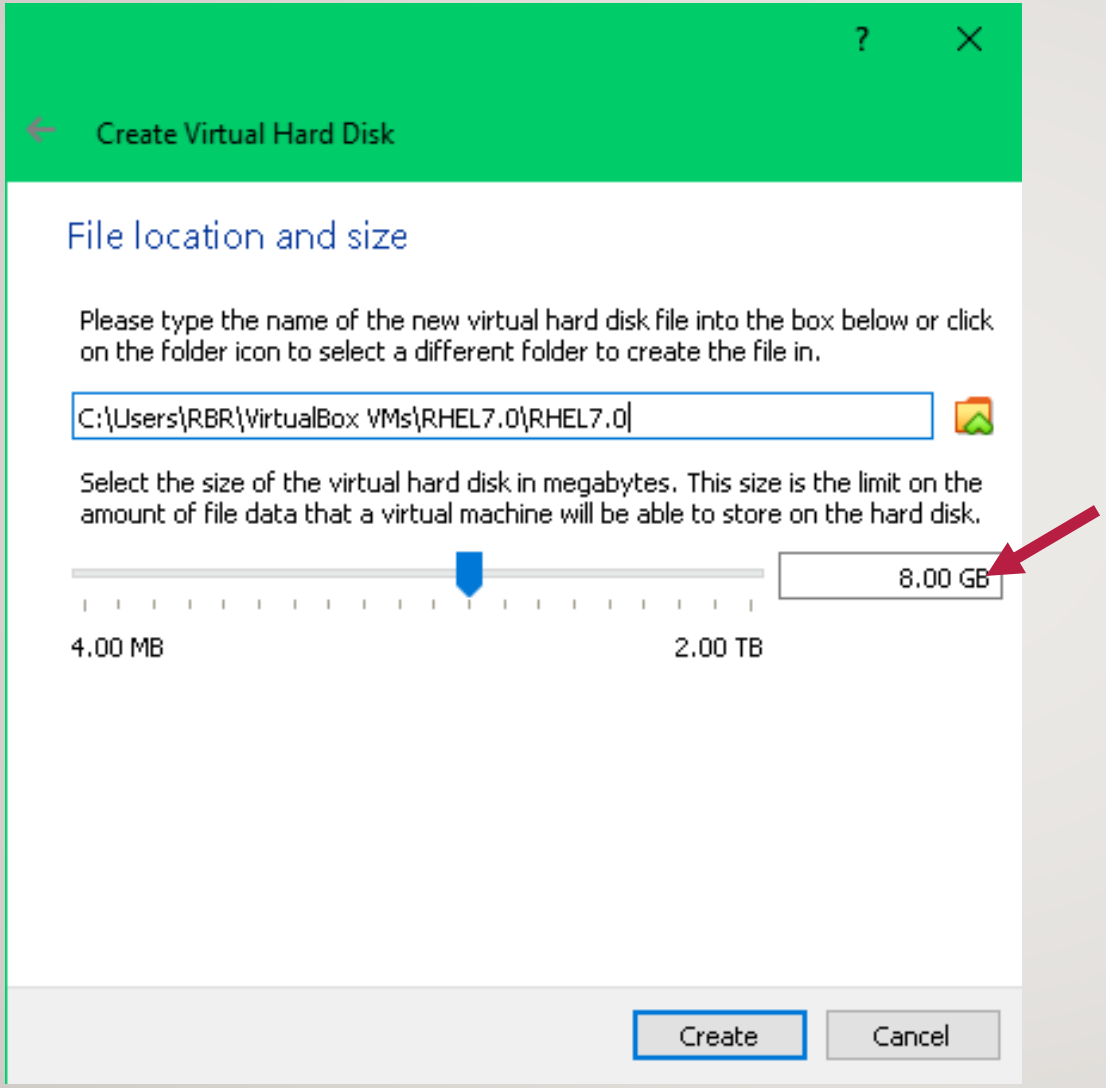
- Step 5:

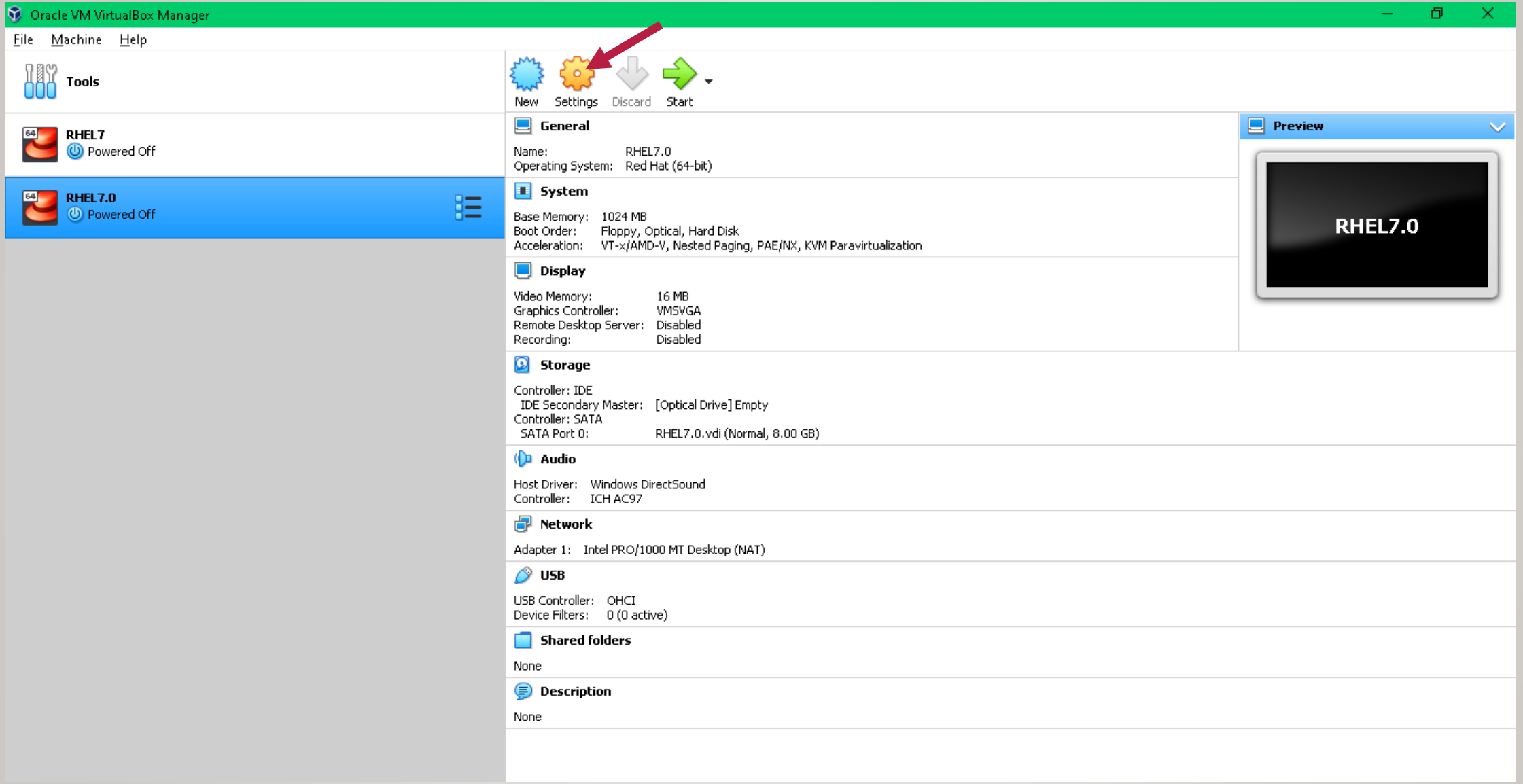

Create Virtual Hard Disk
Hard disk file type
Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.
VDI (VirtualBox Disk Image)
VHD (Virtual Hard Disk)
VMDK (Virtual Machine Disk)
Expert Mode
Next
Cancel

- Step 6:

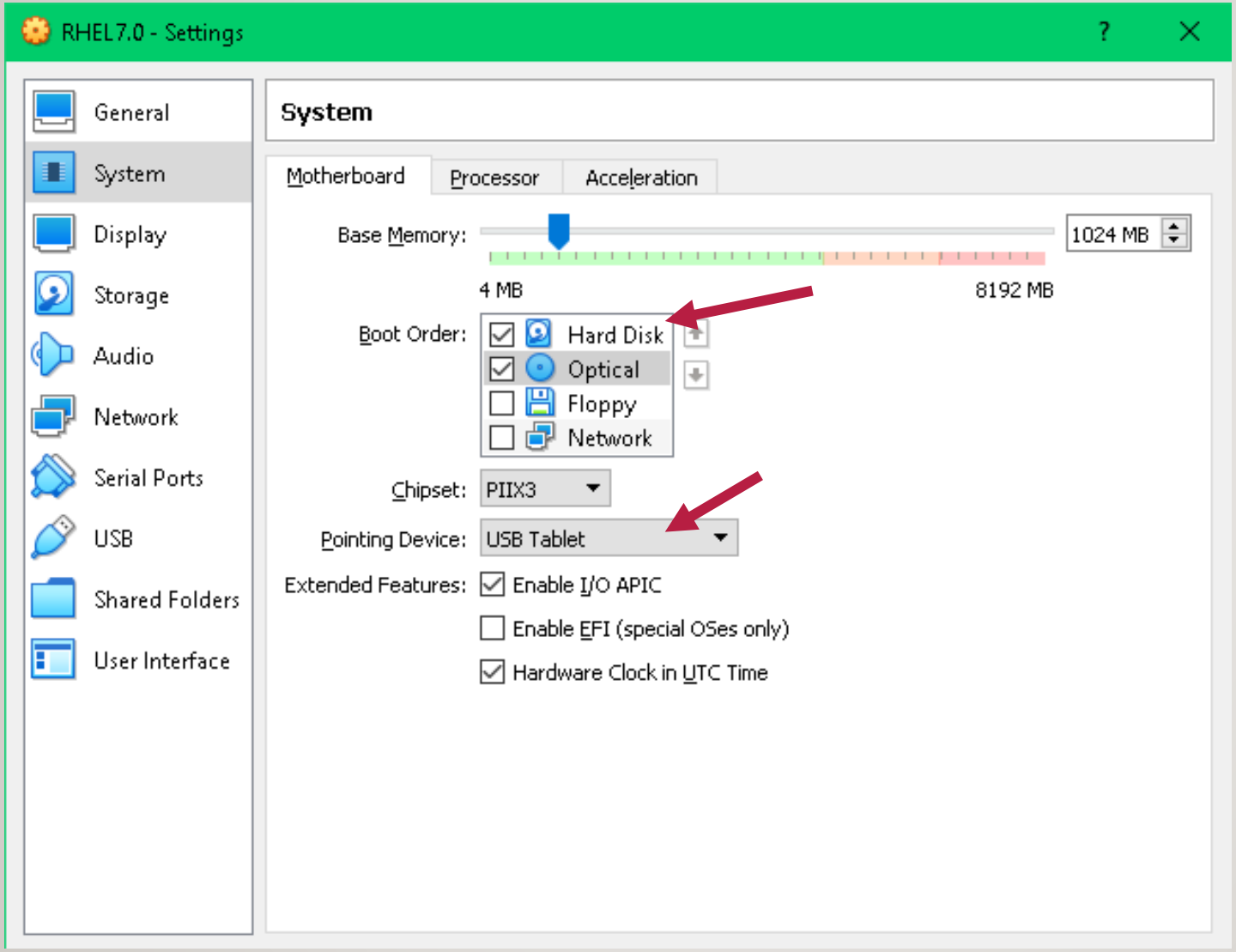

Create Virtual Hard Disk
Storage on physical hard disk
Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).
A dynamically allocated hard disk file will only use space on your physical hard disk as it fills up (up to a maximum fixed size), although it will not shrink again automatically when space on it is freed.
A fixed size hard disk file may take longer to create on some systems but is often faster to use.
Dynamically allocated
Fixed size
Next
Cancel

- Step 7: preferred size is 20GB. If you want to have some data you can increase the size accordingly.

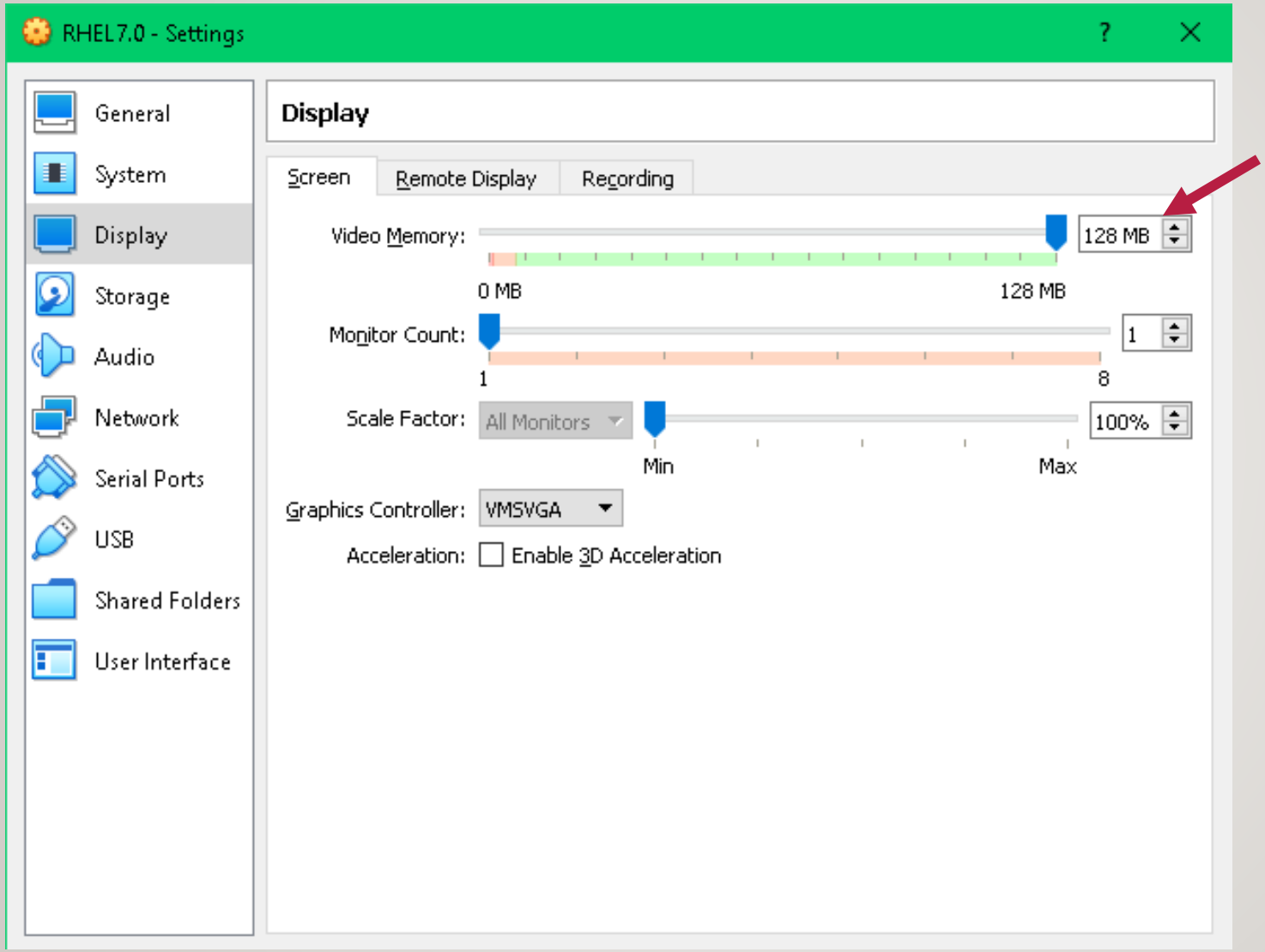



Oracle VM VirtualBox Manager
File
Machine
Help
Tools
RHEL7
Powered Off
RHEL7.0
Powered Off
New
Settings
Discard
Start
General
Name: RHEL7.0
Operating System: Red Hat (64-bit)
System
Base Memory: 1024 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, PAE/NX, KVM Paravirtualization
Display
Video Memory: 16 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled
Preview
RHEL7.0
Storage
Controller: IDE
IDE Secondary Master: [Optical Drive] Empty
Controller: SATA
SATA Port 0: RHEL7.0.vdi (Normal, 8.00 GB)
Audio
Host Driver: Windows DirectSound
Controller: ICH AC97
Network
Adapter 1: Intel PRO/1000 MT Desktop (NAT)
USB
USB Controller: OHCI
Device Filters: 0 (0 active)
Shared folders
None
Description
None

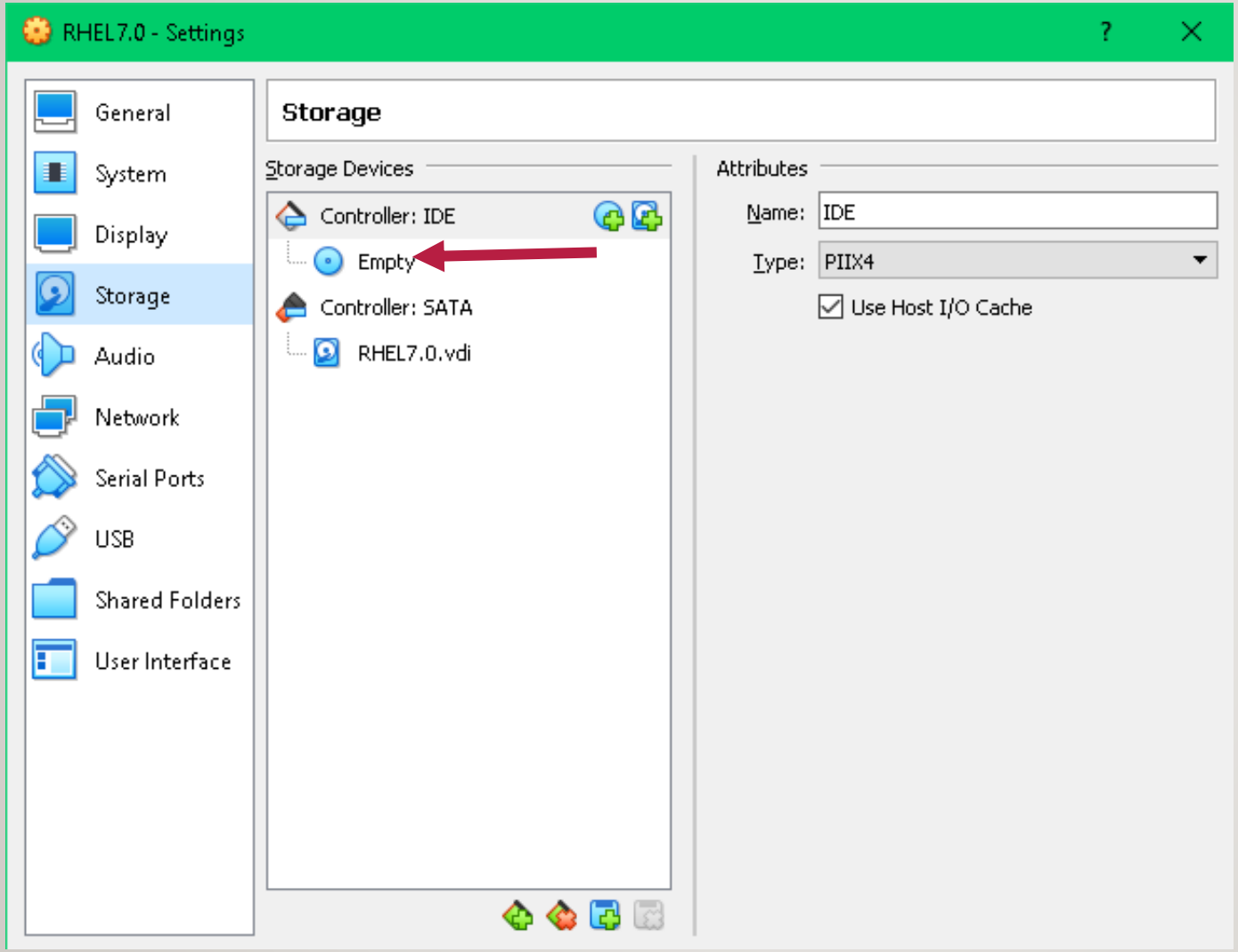
- Step 8:


RHEL7.0 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
System
Motherboard
Processor
Acceleration
Base Memory:
1024 MB
4 MB
8192 MB
Boot Order:
Hard Disk
Optical
Floppy
Network
Chipset:
PIIX3
Pointing Device:
USB Tablet
Extended Features:
Enable I/O APIC
Enable EFI (special OSes only)
Hardware Clock in UTC Time

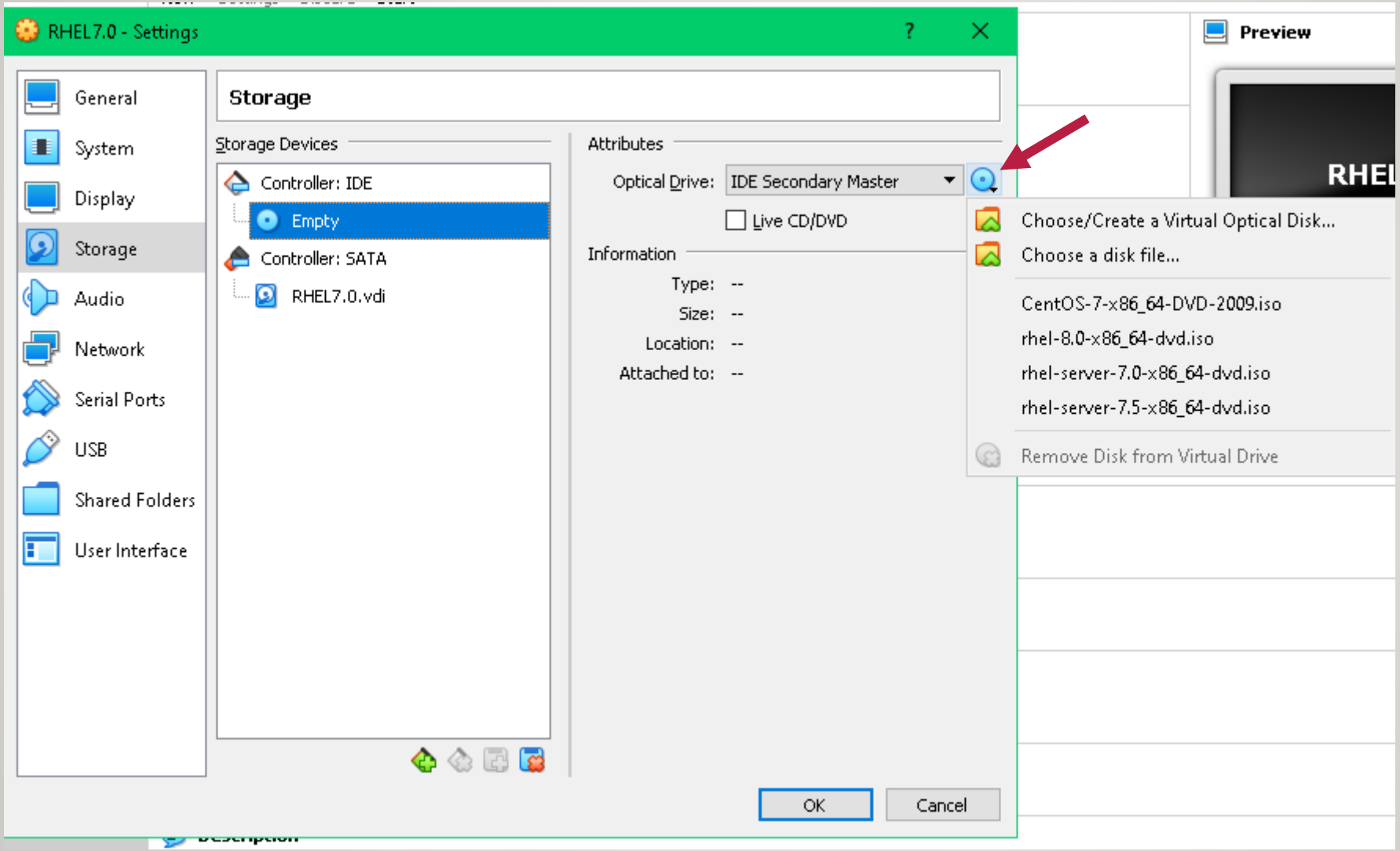
- Step 9:

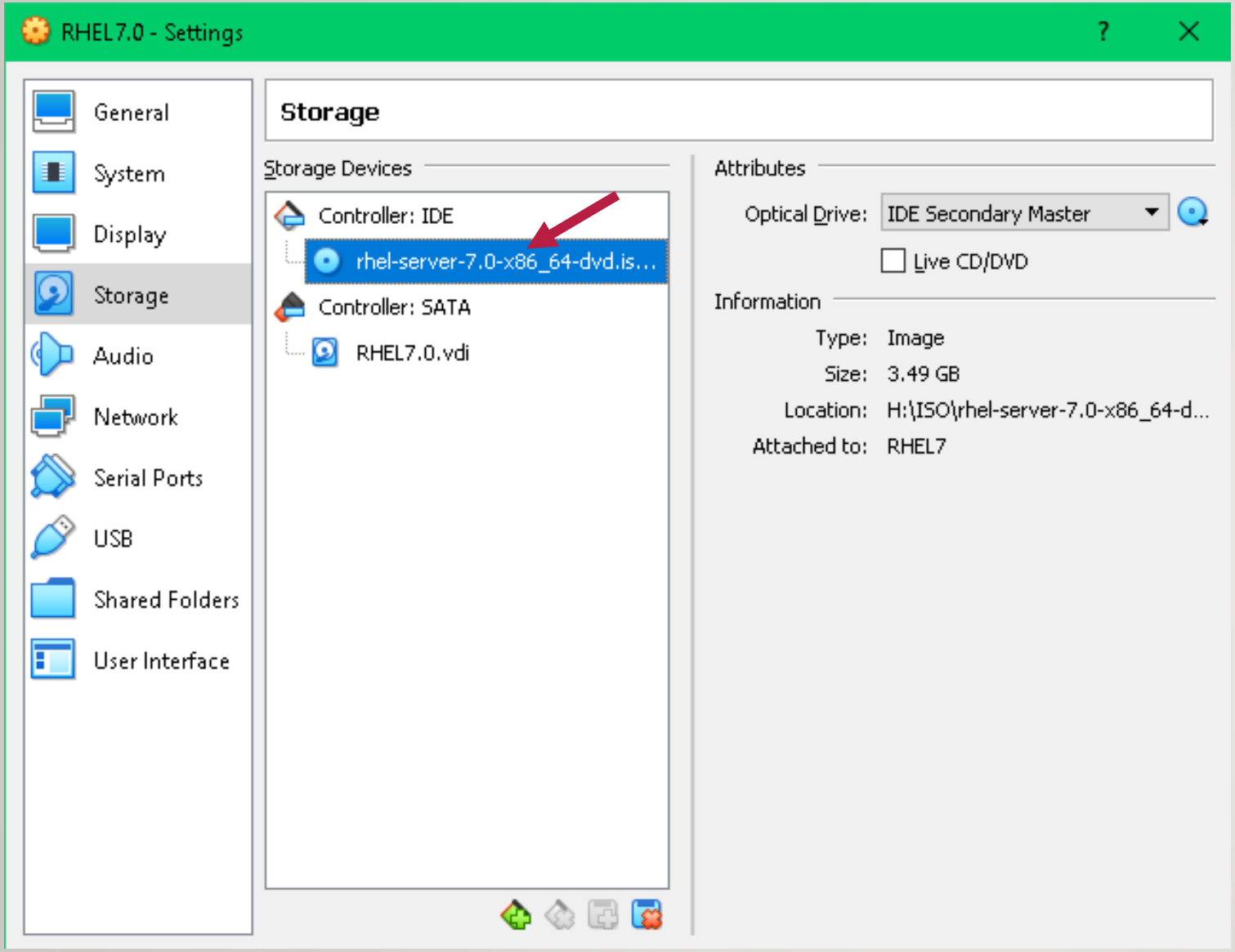

RHEL7.0 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Display
Screen
Remote Display
Recording
Video Memory:
128 MB
0 MB
128 MB
Monitor Count:
1
1
8
Scale Factor:
All Monitors
100%
Min
Max
Graphics Controller:
VMSVGA
Acceleration:
Enable 3D Acceleration

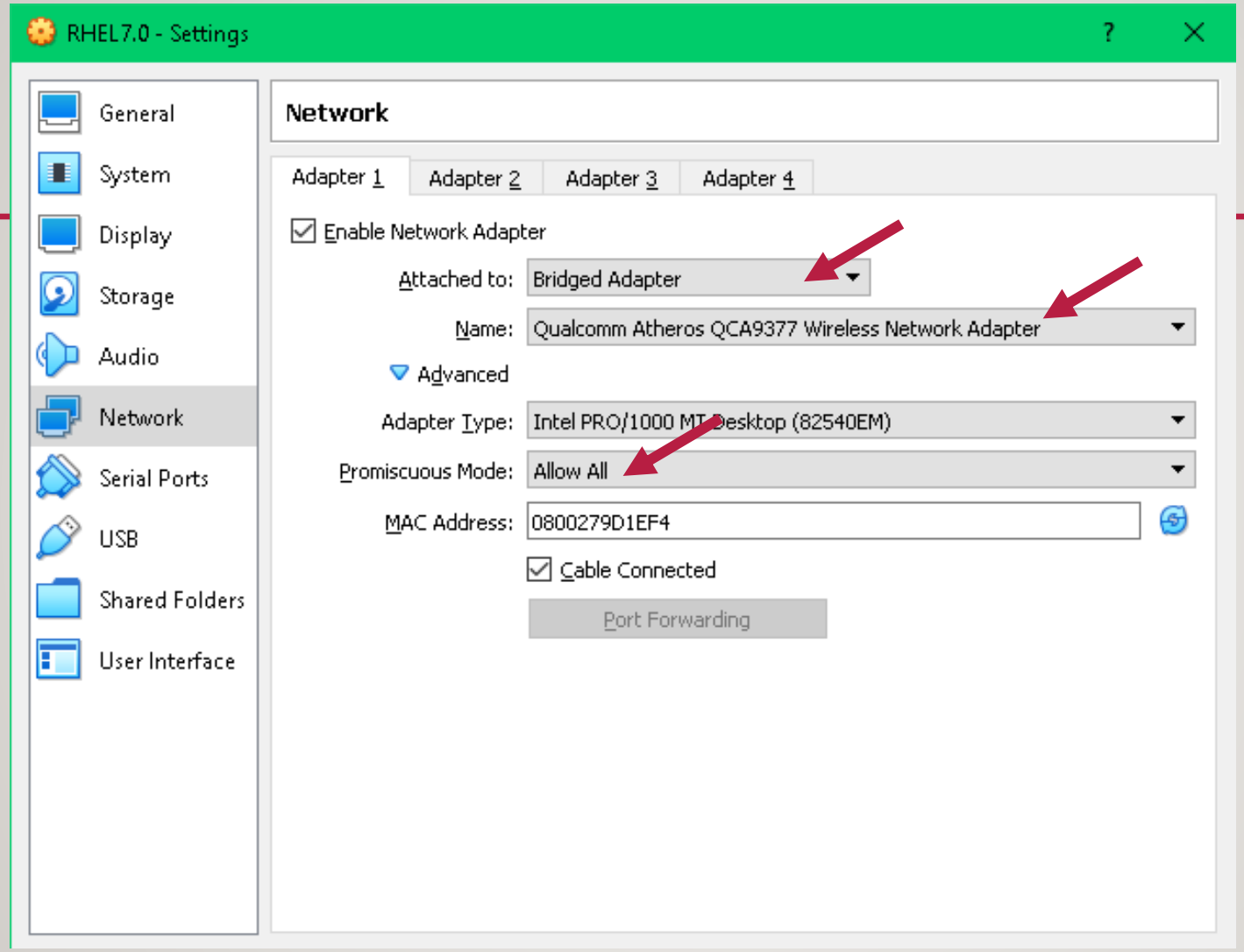
- Step 10:


RHEL7.0 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Storage
Storage Devices
Controller: IDE
Empty
Controller: SATA
RHEL7.0.vdi
Attributes
Name:
IDE
Type:
PIIX4
Use Host I/O Cache

- Step 10:


RHEL7.0 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Storage
Storage Devices
Controller: IDE
Empty
Controller: SATA
RHEL7.0.vdi
Attributes
Optical Drive:
IDE Secondary Master
Live CD/DVD
Information
Type: --
Size: --
Location: --
Attached to: --
OK
Cancel
Preview
Choose/Create a Virtual Optical Disk...
Choose a disk file...
CentOS-7-x86_64-DVD-2009.iso
rhel-8.0-x86_64-dvd.iso
rhel-server-7.0-x86_64-dvd.iso
rhel-server-7.5-x86_64-dvd.iso
Remove Disk from Virtual Drive

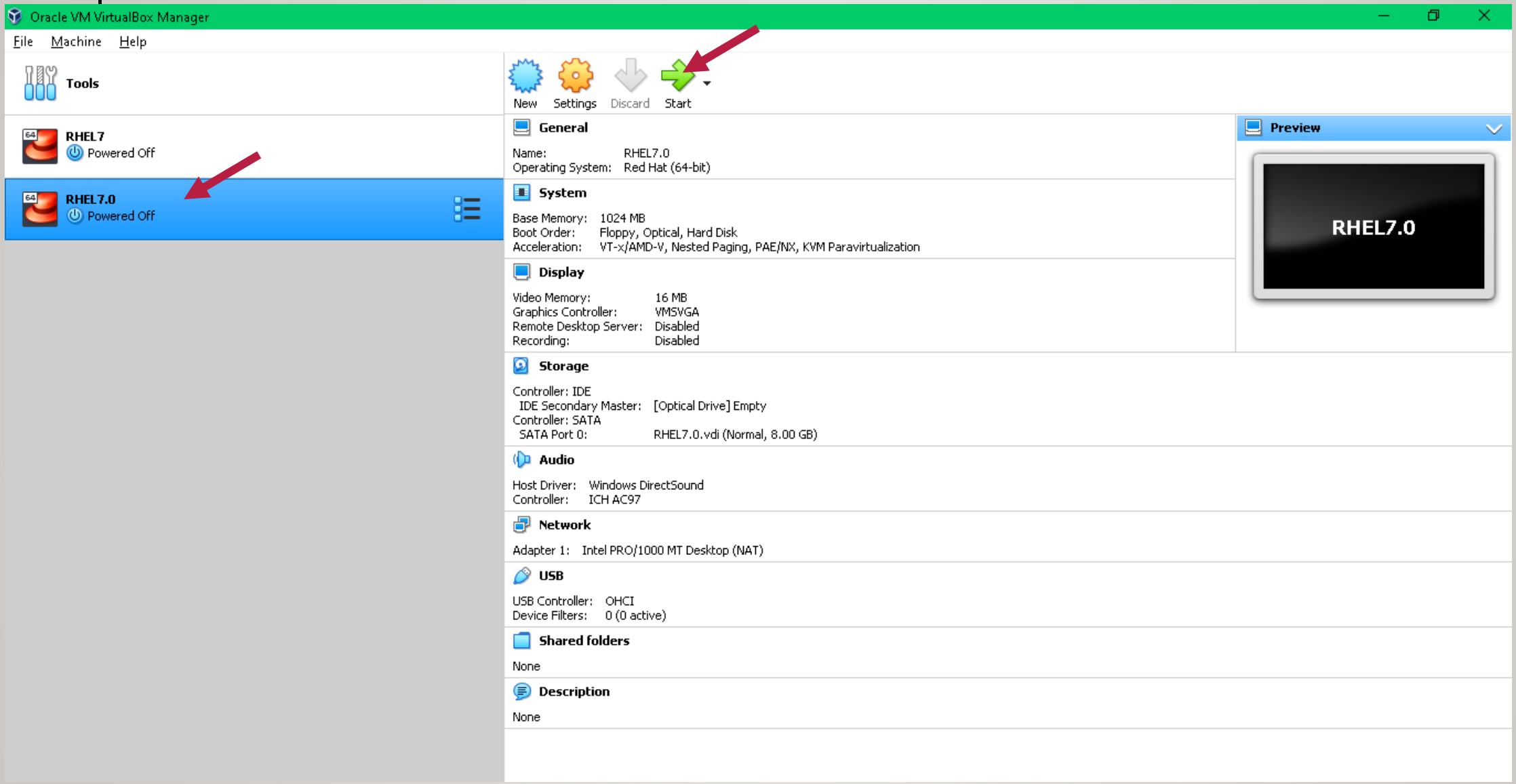

RHEL7.0 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Storage
Storage Devices
Controller: IDE
rhel-server-7.0-x86_64-dvd.is...
Controller: SATA
RHEL7.0.vdi
Attributes
Optical Drive:
IDE Secondary Master
Live CD/DVD
Information
Type: Image
Size: 3.49 GB
Location: H:\ISO\rhel-server-7.0-x86_64-d...
Attached to: RHEL7


RHEL7.0 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Network
Adapter 1
Adapter 2
Adapter 3
Adapter 4
Enable Network Adapter
Attached to:
Bridged Adapter
Name:
Qualcomm Atheros QCA9377 Wireless Network Adapter
Advanced
Adapter Type:
Intel PRO/1000 MT Desktop (82540EM)
Promiscuous Mode:
Allow All
MAC Address:
0800279D1EF4
Cable Connected
Port Forwarding

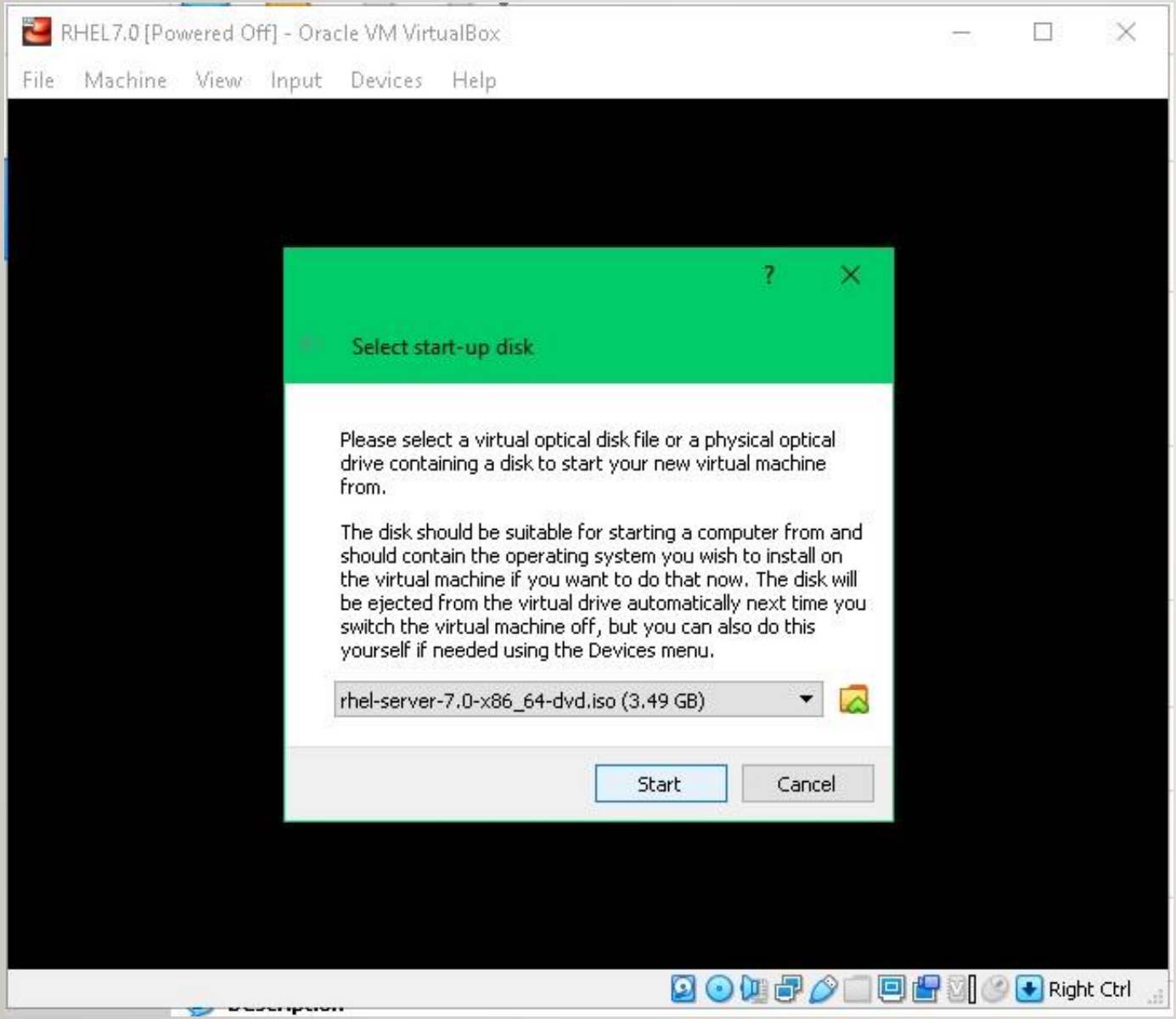
Installation in a Physical Machine

- you can skip those previous steps cause we aren't using any VM.
- Keep your DVD ISO ready in a bootable pendrive or in a DVD disk.
- Ensure you change the boot order to USB drive or Optical Drive as required.
- You can proceed the installation as same as here.

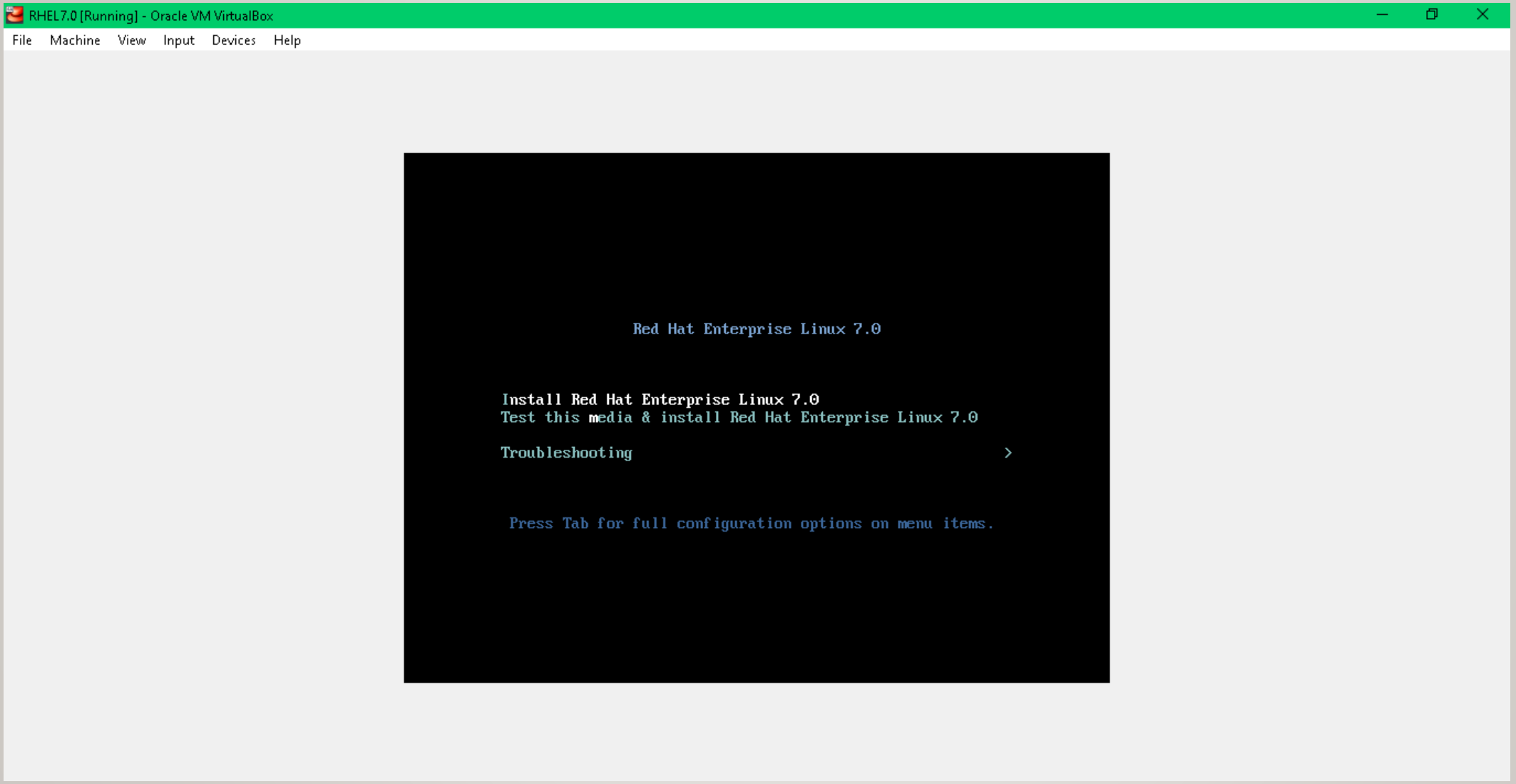
- Step 11:

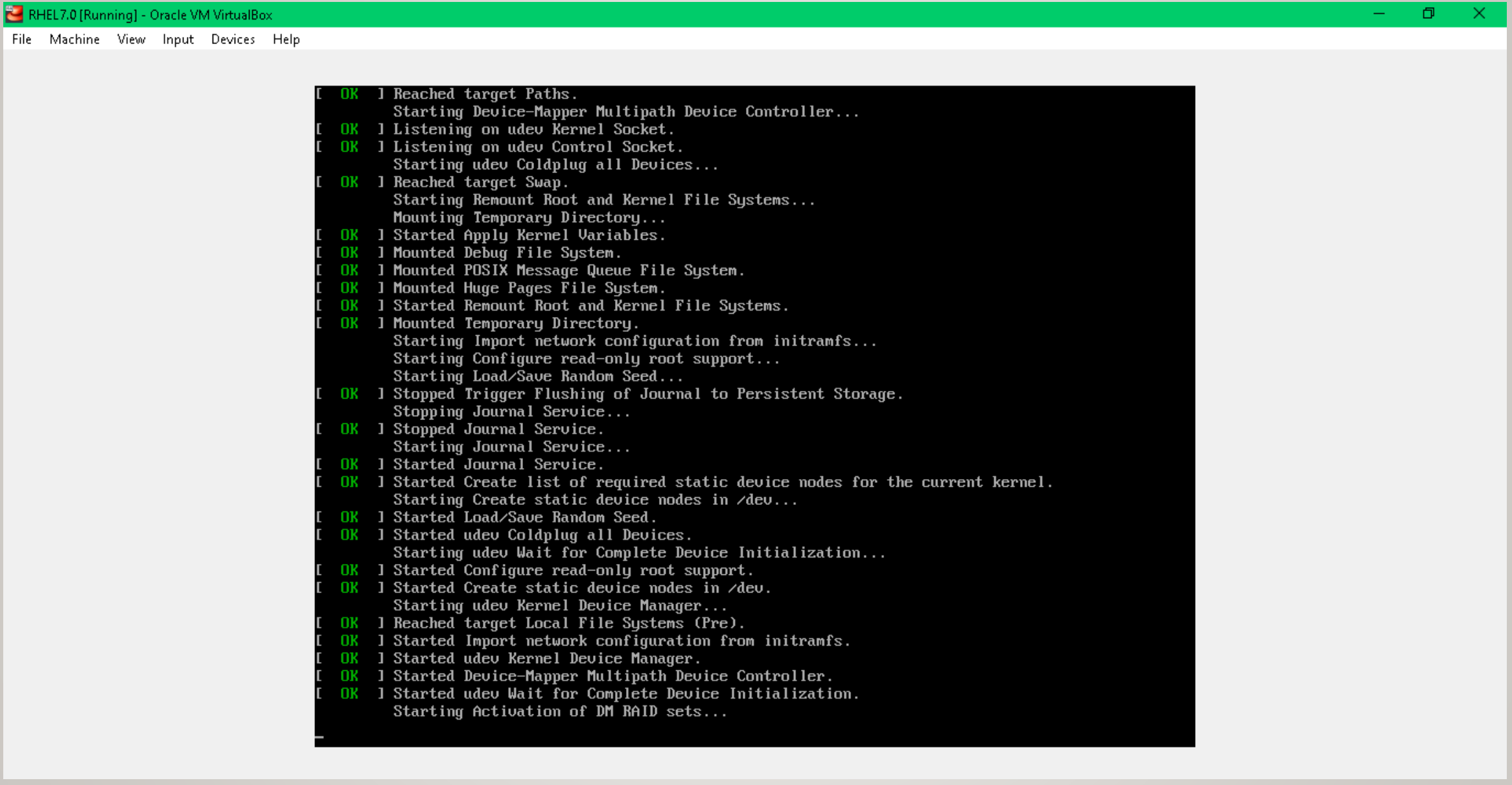

Oracle VM VirtualBox Manager
File
Machine
Help
Tools
RHEL7
Powered Off
RHEL7.0
Powered Off
New
Settings
Discard
Start
General
Name: RHEL7.0
Operating System: Red Hat (64-bit)
System
Base Memory: 1024 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, PAE/NX, KVM Paravirtualization
Display
Video Memory: 16 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled
Storage
Controller: IDE
IDE Secondary Master: [Optical Drive] Empty
Controller: SATA
SATA Port 0: RHEL7.0.vdi (Normal, 8.00 GB)
Audio
Host Driver: Windows DirectSound
Controller: ICH AC97
Network
Adapter 1: Intel PRO/1000 MT Desktop (NAT)
USB
USB Controller: OHCI
Device Filters: 0 (0 active)
Shared folders
None
Description
None
Preview
RHEL7.0

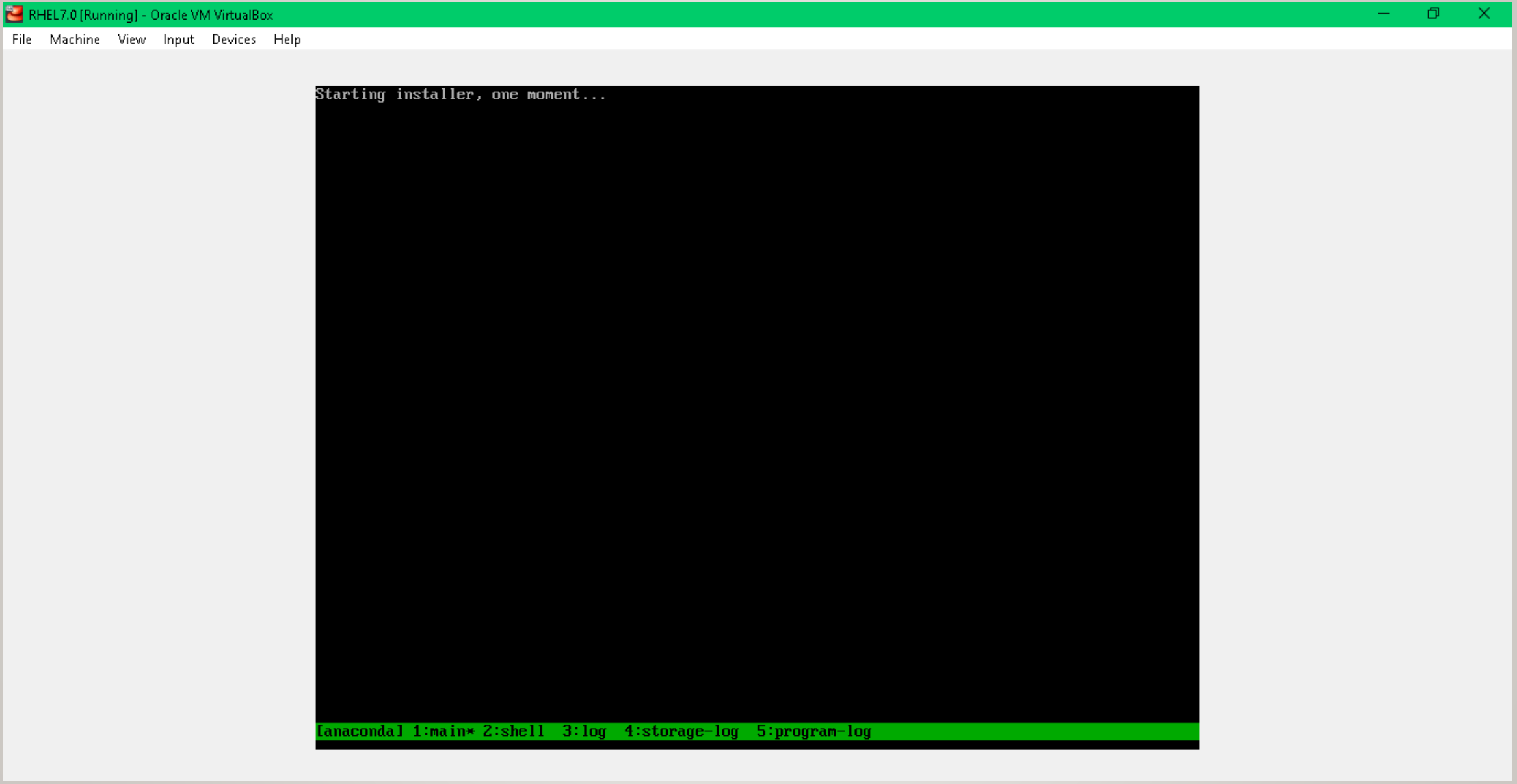
- Step 12:


RHEL7.0 [Powered Off] - Oracle VM VirtualBox
File Machine View Input Devices Help
Select start-up disk
Please select a virtual optical disk file or a physical optical drive containing a disk to start your new virtual machine from.
The disk should be suitable for starting a computer from and should contain the operating system you wish to install on the virtual machine if you want to do that now. The disk will be ejected from the virtual drive automatically next time you switch the virtual machine off, but you can also do this yourself if needed using the Devices menu.
rhel-server-7.0-x86_64-dvd.iso (3.49 GB)
Start
Cancel
Right Ctrl

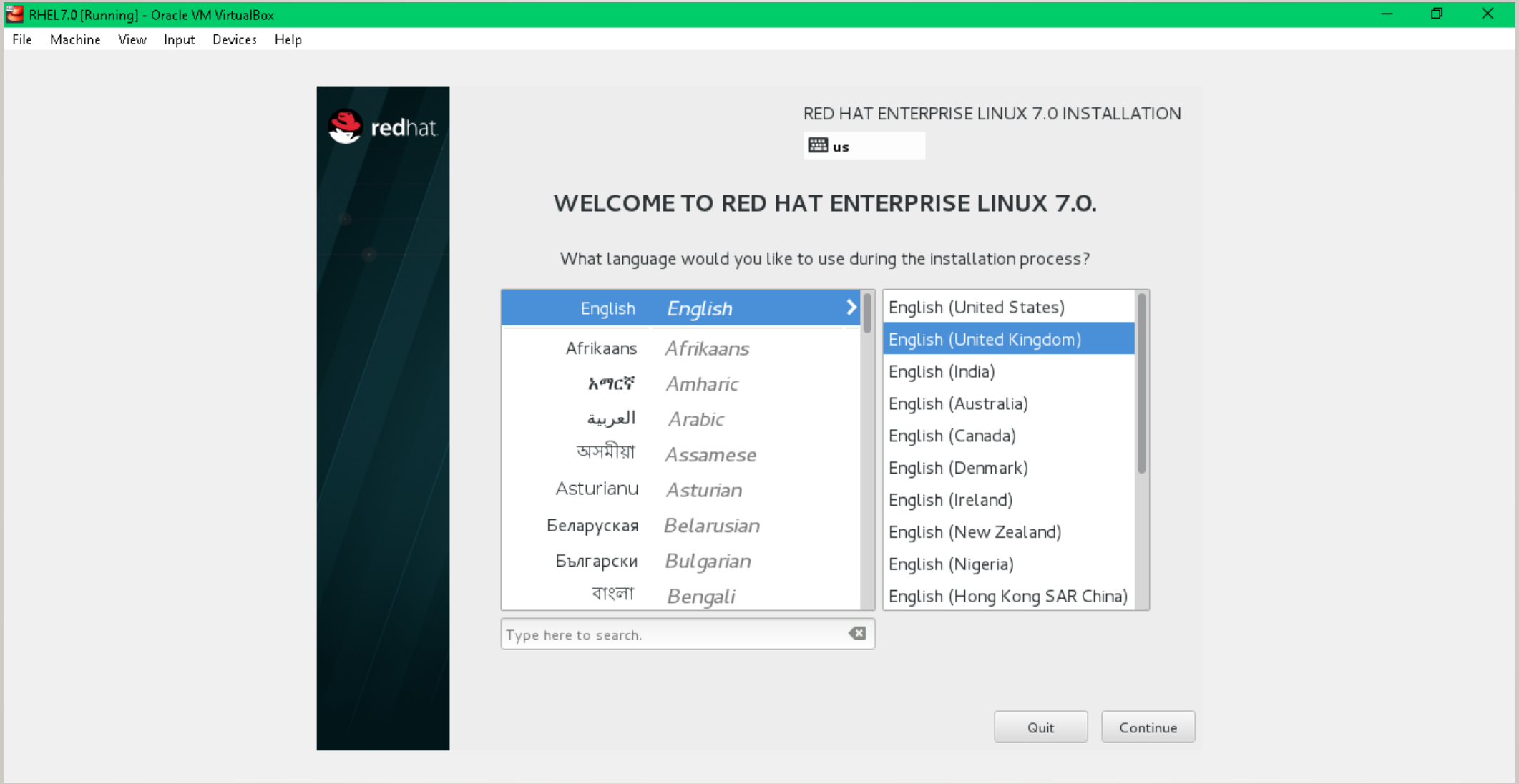
- Step 13:


RHEL7.0 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Red Hat Enterprise Linux 7.0
Install Red Hat Enterprise Linux 7.0
Test this media & install Red Hat Enterprise Linux 7.0
Troubleshooting
Press Tab for full configuration options on menu items.

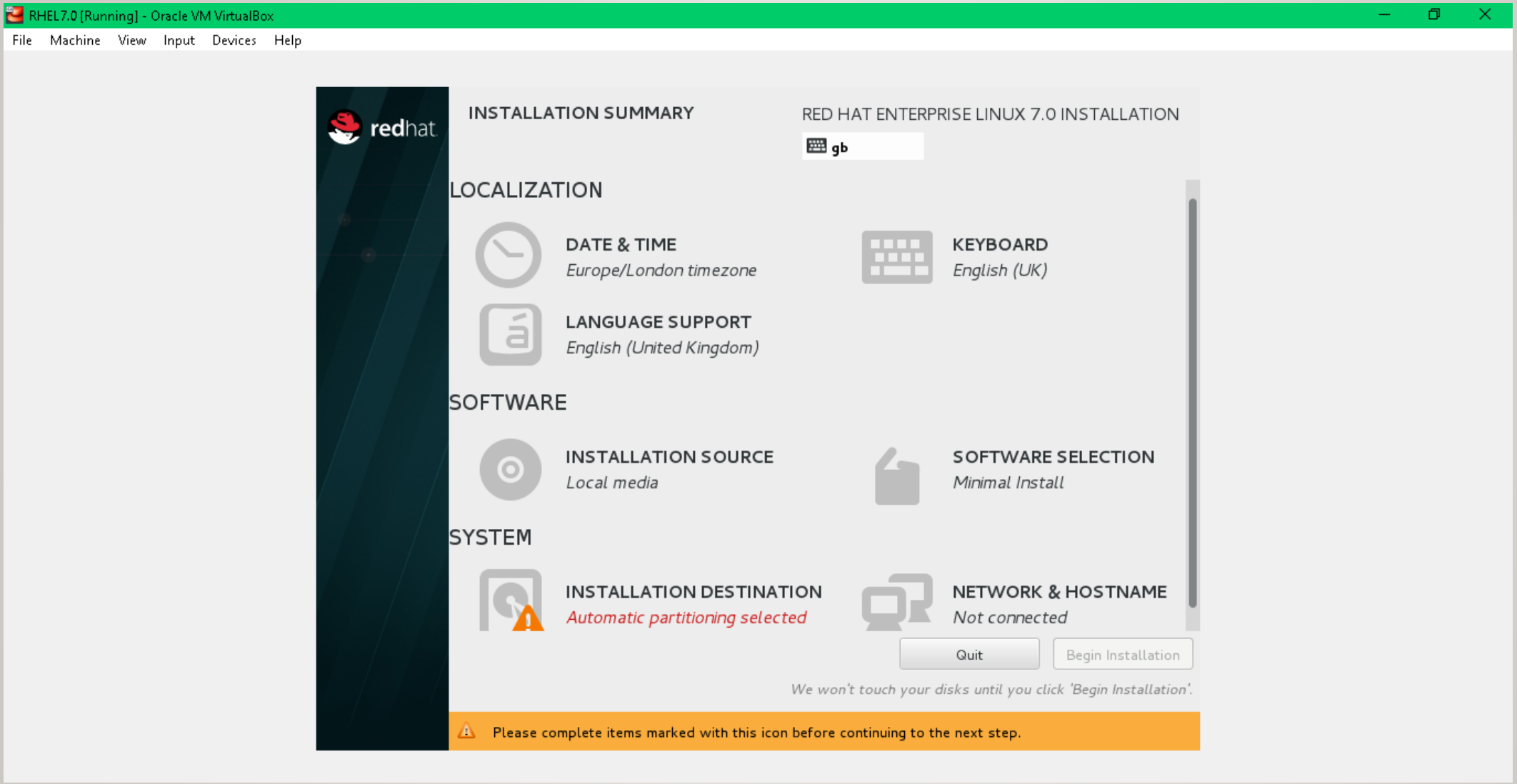

RHEL7.0 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
[OK] Reached target Paths.
Starting Device-Mapper Multipath Device Controller...
[OK] Listening on udev Kernel Socket.
[OK] Listening on udev Control Socket.
Starting udev Coldplug all Devices...
[OK] Reached target Swap.
Starting Remount Root and Kernel File Systems...
Mounting Temporary Directory...
[OK] Started Apply Kernel Variables.
[OK] Mounted Debug File System.
[OK] Mounted POSIX Message Queue File System.
[OK] Mounted Huge Pages File System.
[OK] Started Remount Root and Kernel File Systems.
[OK] Mounted Temporary Directory.
Starting Import network configuration from initramfs...
Starting Configure read-only root support...
Starting Load/Save Random Seed...
[OK] Stopped Trigger Flushing of Journal to Persistent Storage.
Stopping Journal Service...
[OK] Stopped Journal Service.
Starting Journal Service...
[OK] Started Journal Service.
[OK] Started Create list of required static device nodes for the current kernel.
Starting Create static device nodes in /dev...
[OK] Started Load/Save Random Seed.
[OK] Started udev Coldplug all Devices.
Starting udev Wait for Complete Device Initialization...
[OK] Started Configure read-only root support.
[OK] Started Create static device nodes in /dev.
Starting udev Kernel Device Manager...
[OK] Reached target Local File Systems (Pre).
[OK] Started Import network configuration from initramfs.
[OK] Started udev Kernel Device Manager.
[OK] Started Device-Mapper Multipath Device Controller.
[OK] Started udev Wait for Complete Device Initialization.
Starting Activation of DM RAID sets...


RHEL7.0 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Starting installer, one moment...
[anaconda] 1:main* 2:shell 3:log 4:storage-log 5:program-log

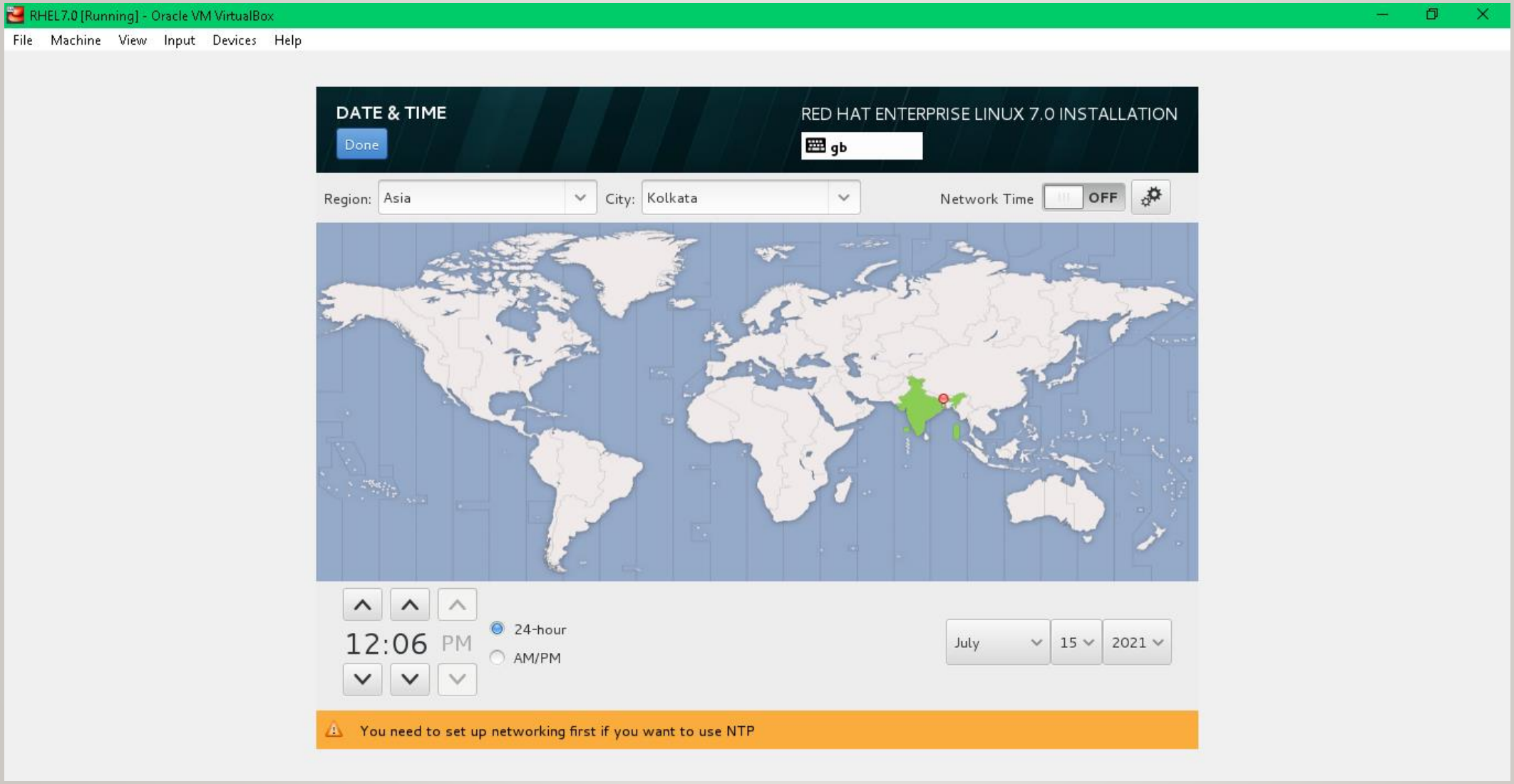
- Step 14: Language selection



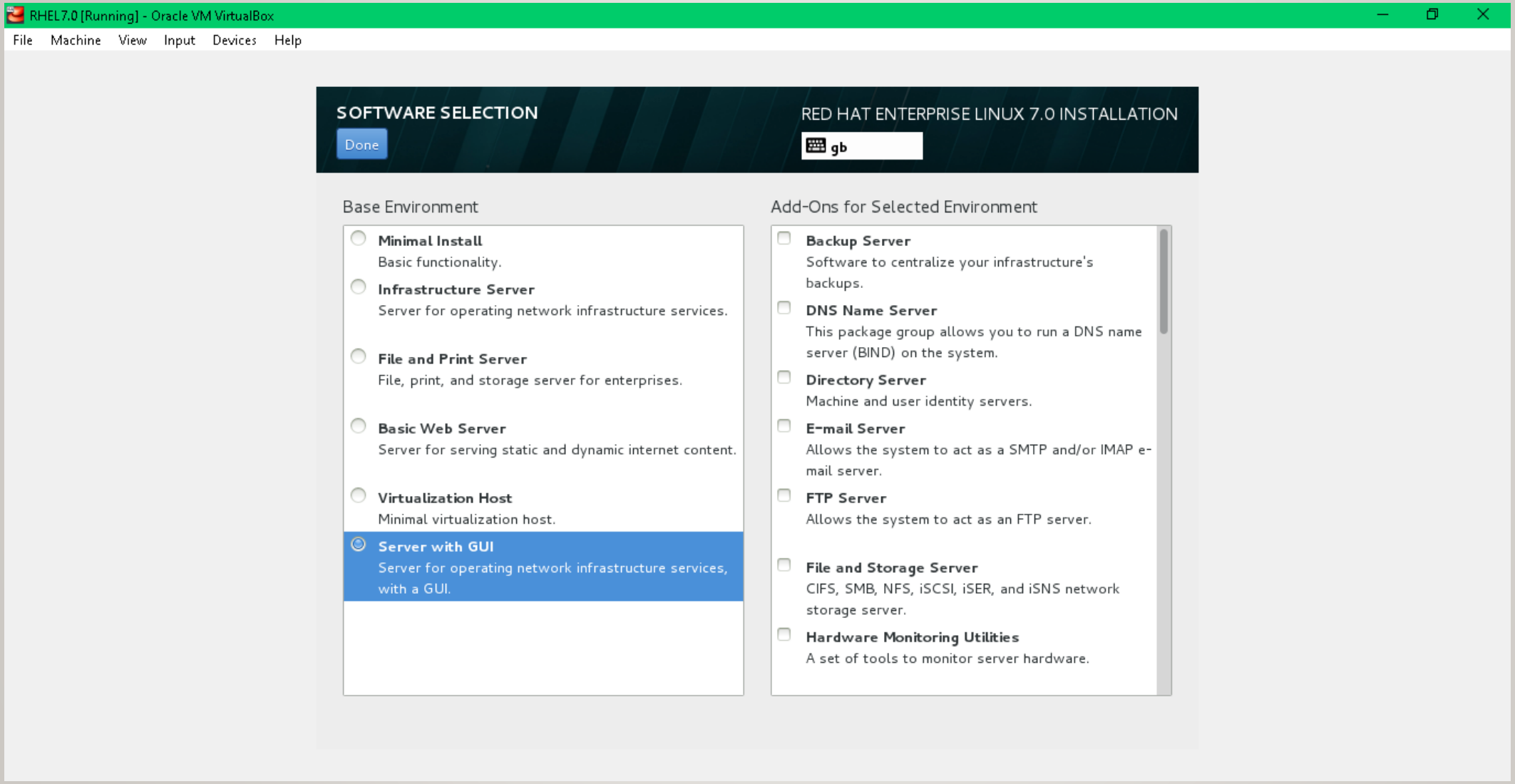
- Step 15: Installation Summary



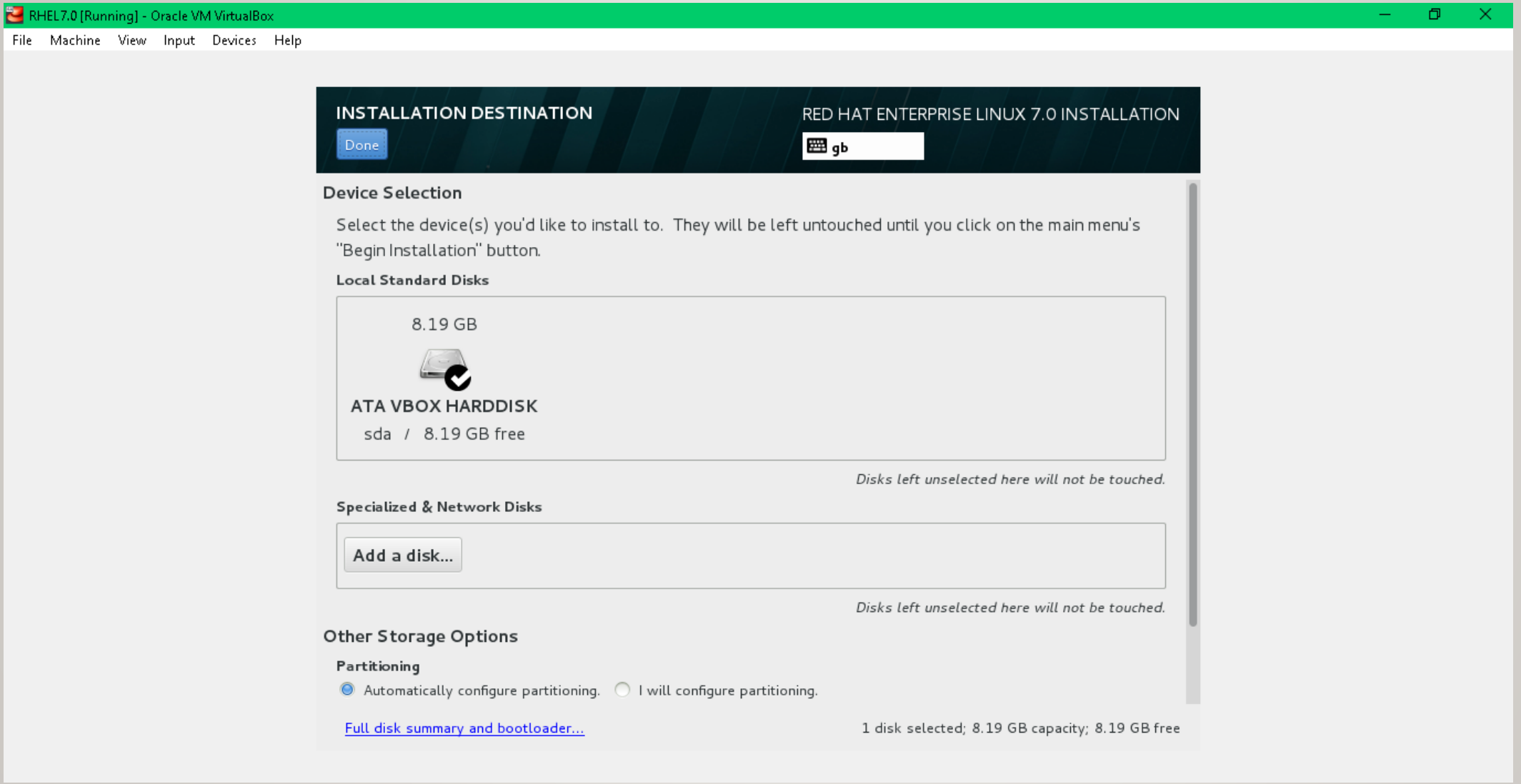
- Step 16: Select Asia/Kolkata as time region



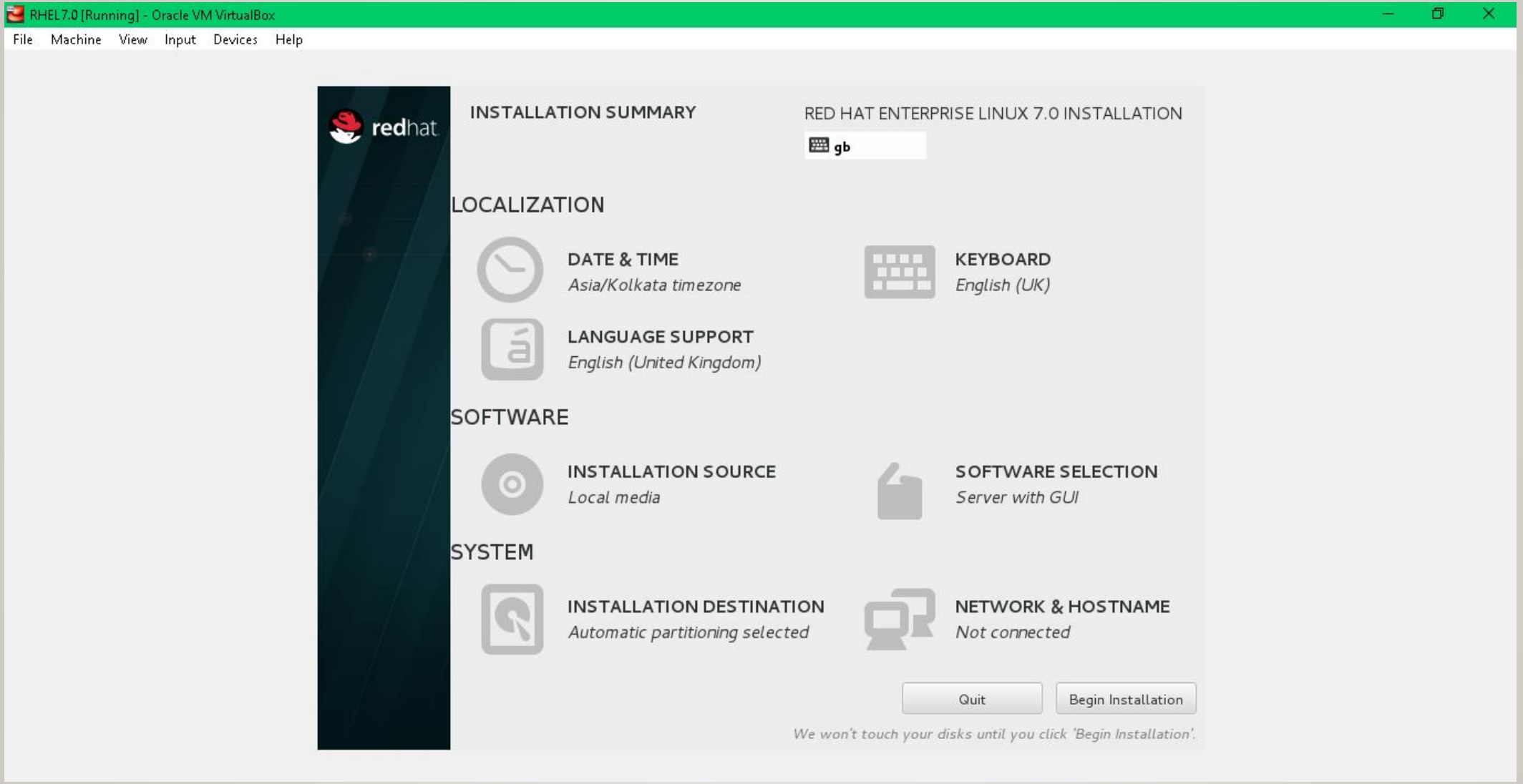
- Step 17: Software Selection – Server with GUI



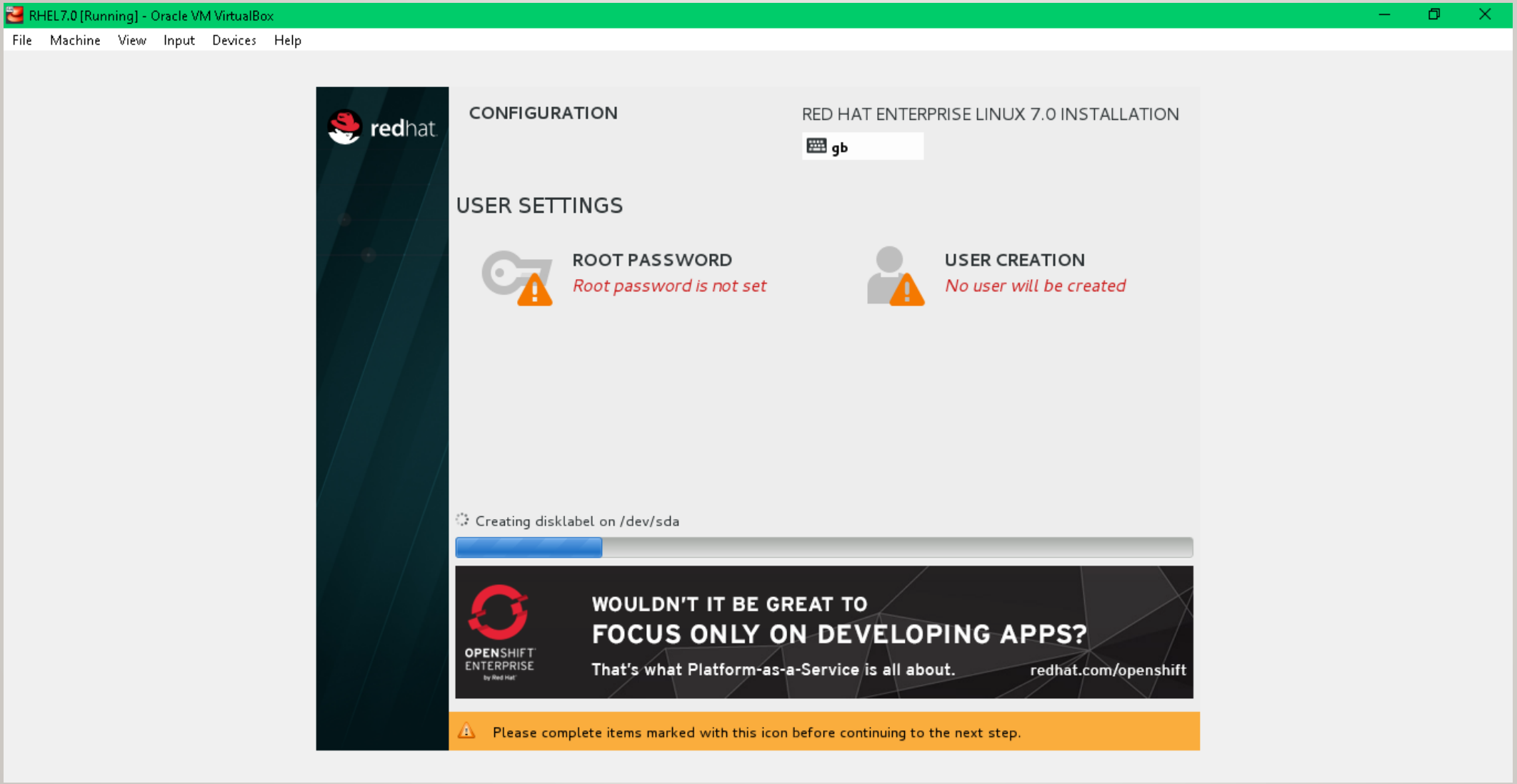
- Step 18: Installation Destination



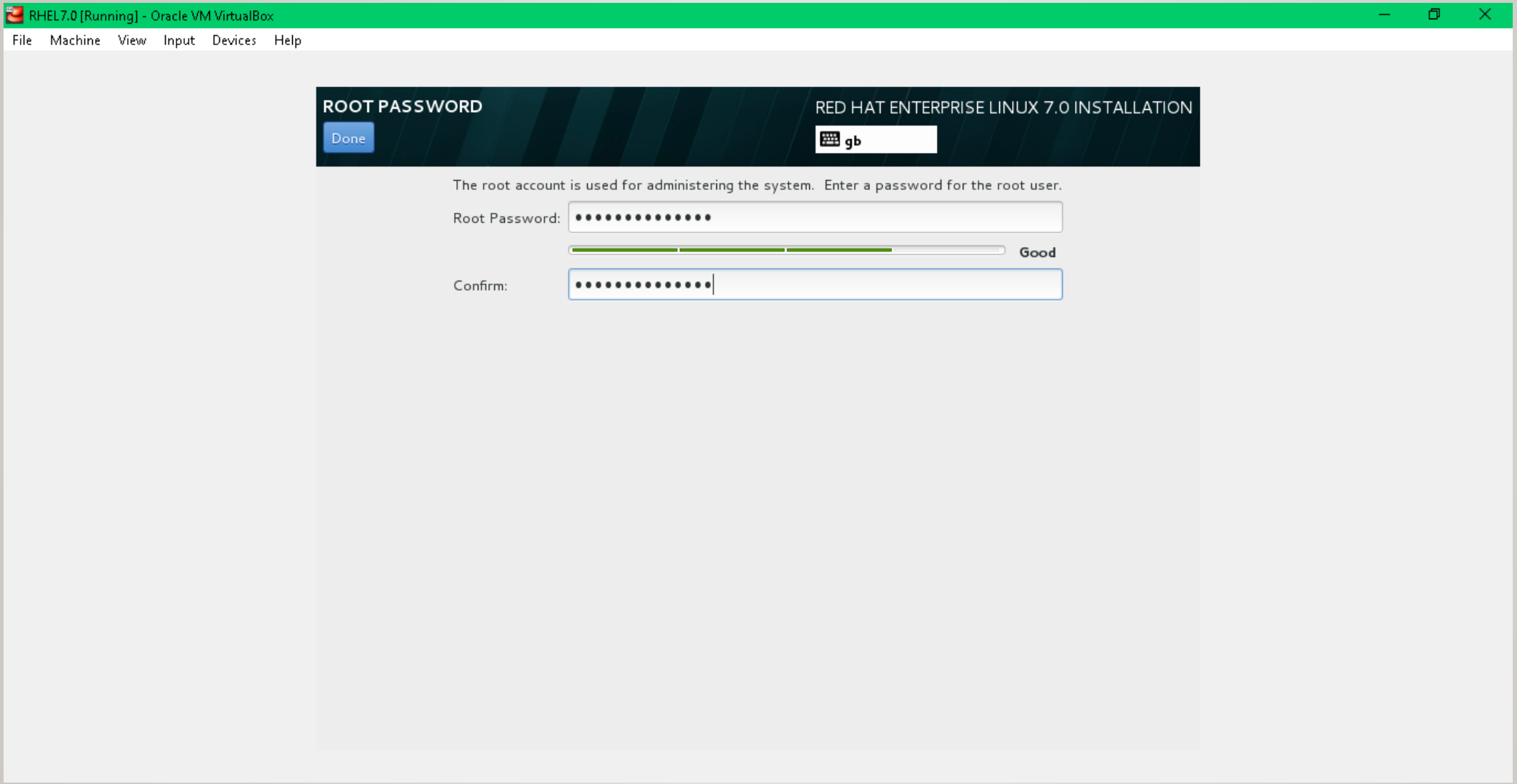
- Step 19: Begin Installation



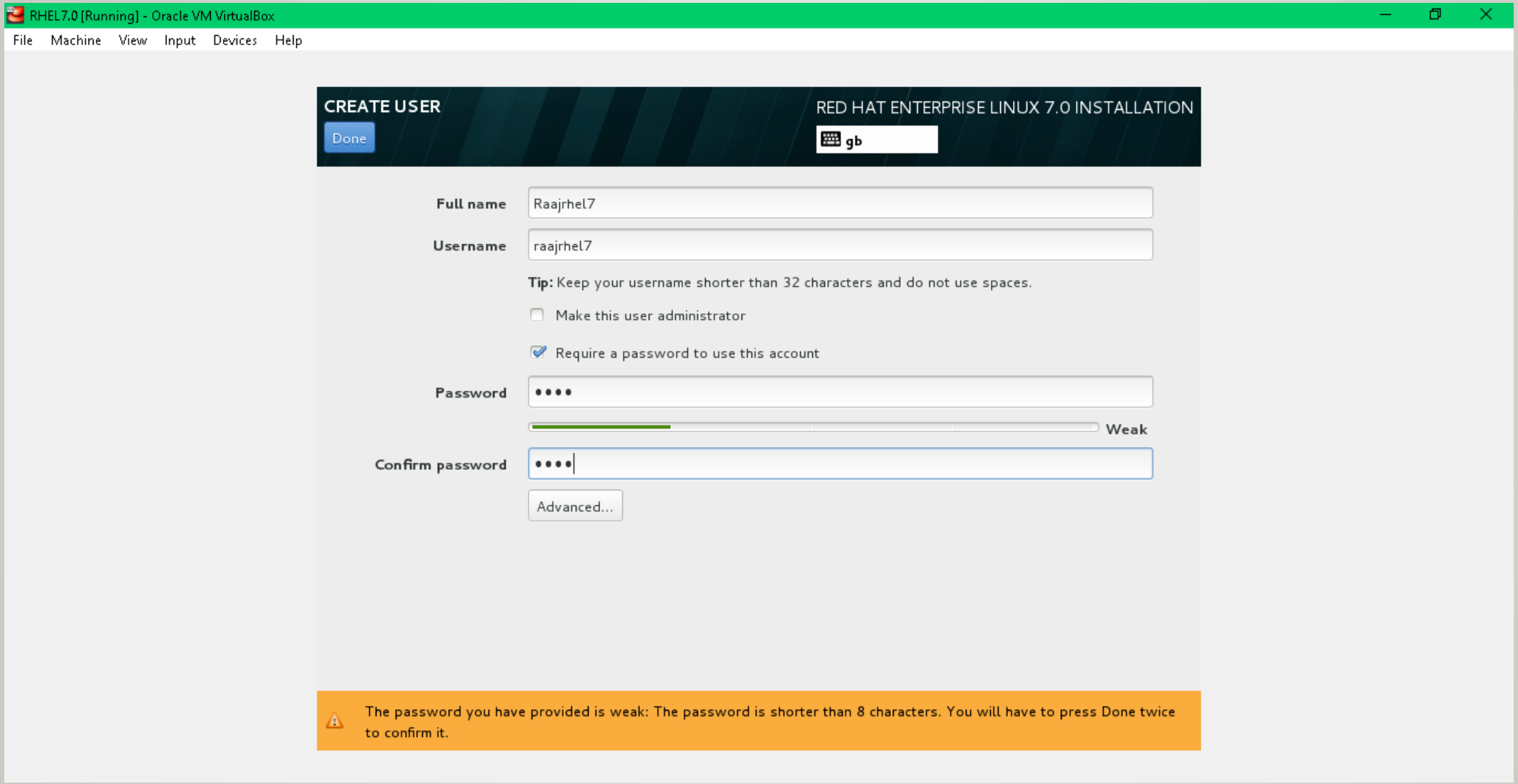
- Step 20:


RHEL7.0 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
redhat
CONFIGURATION
RED HAT ENTERPRISE LINUX 7.0 INSTALLATION
gb
USER SETTINGS
ROOT PASSWORD
Root password is not set
USER CREATION
No user will be created
Creating disklabel on /dev/sda
OPENSHIFT ENTERPRISE
WOULDN'T IT BE GREAT TO
FOCUS ONLY ON DEVELOPING APPS?
That's what Platform-as-a-Service is all about.
redhat.com/openshift
Please complete items marked with this icon before continuing to the next step.

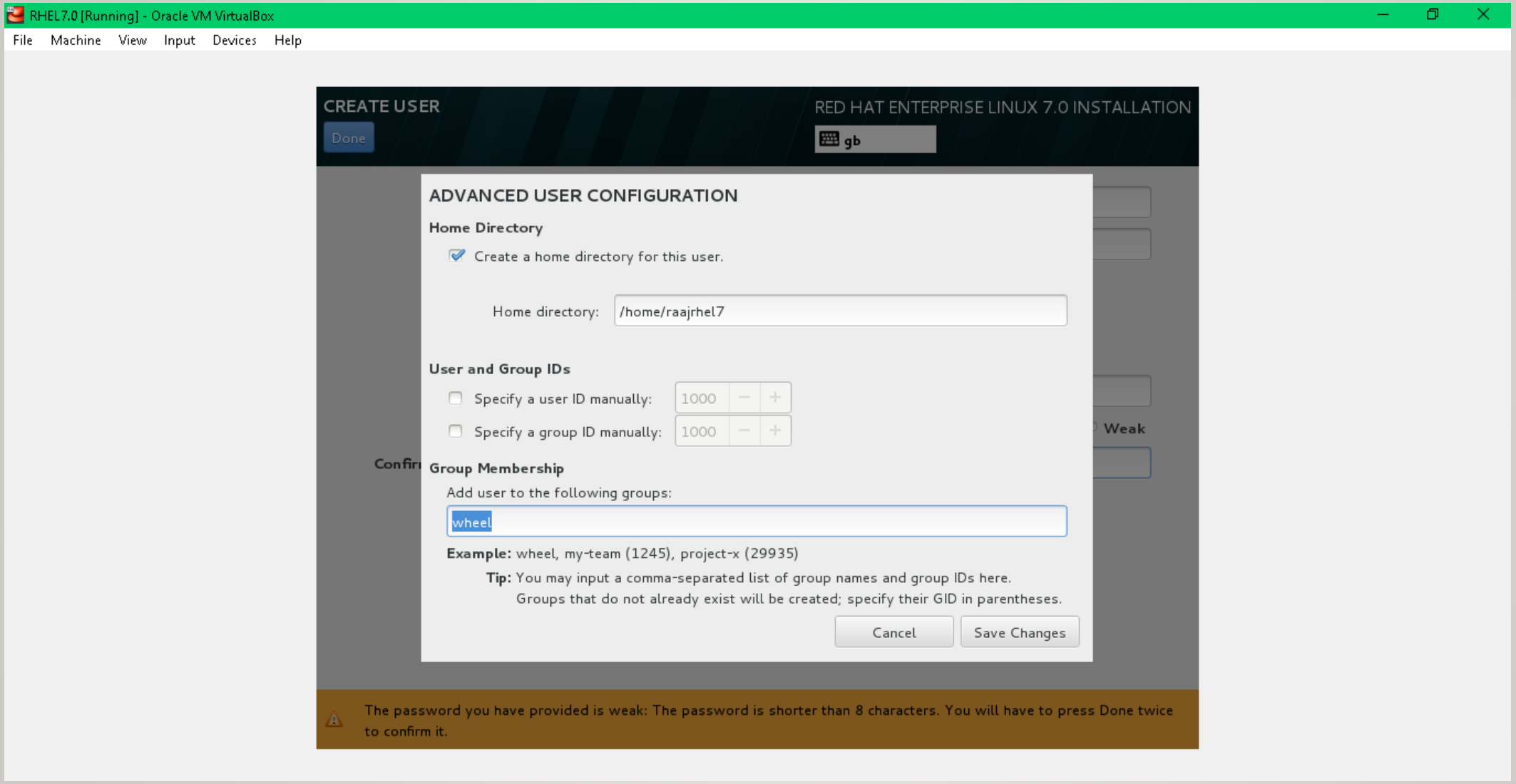
- Step 21: Set ROOT Password



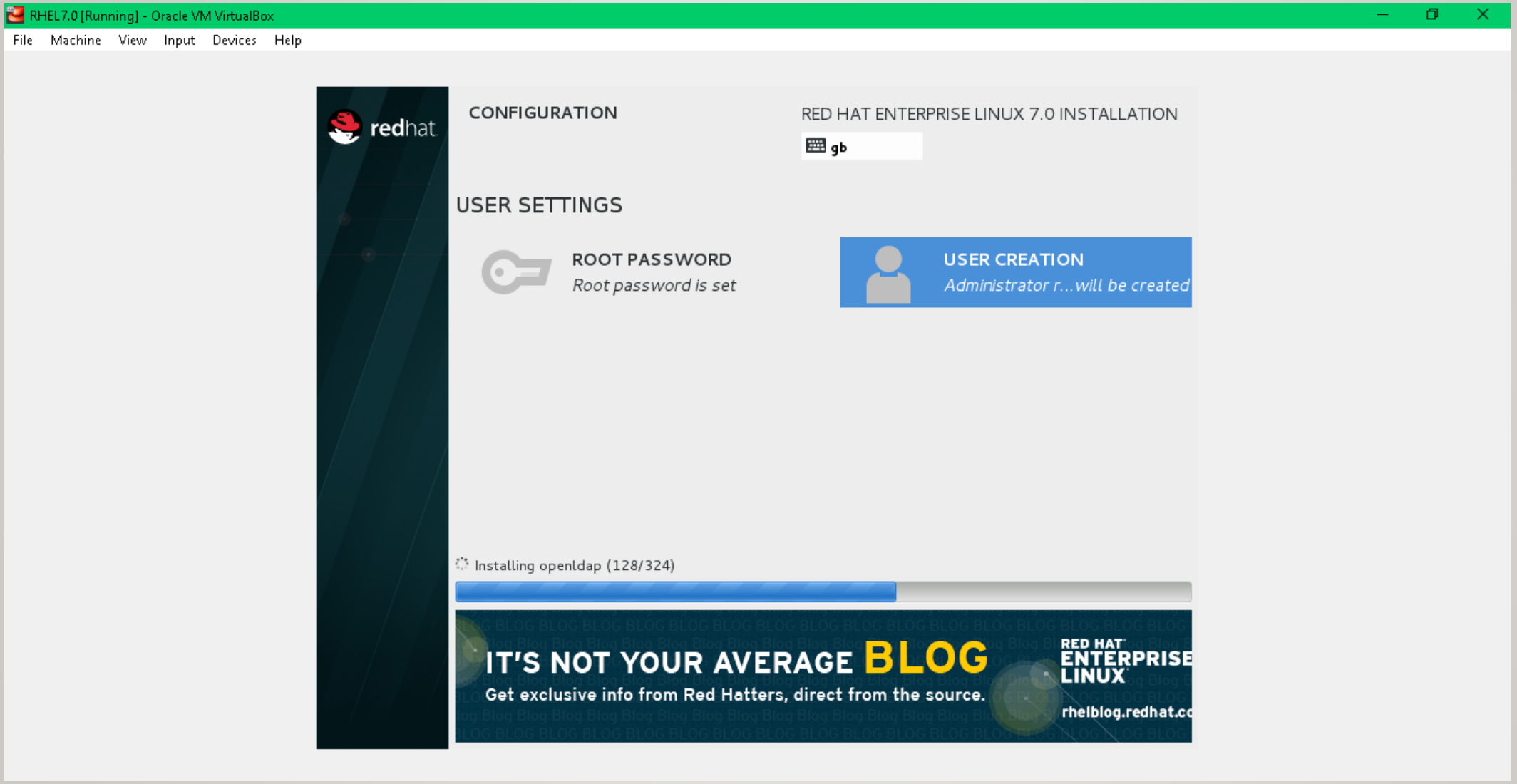
- Step 22: Create a Normal User



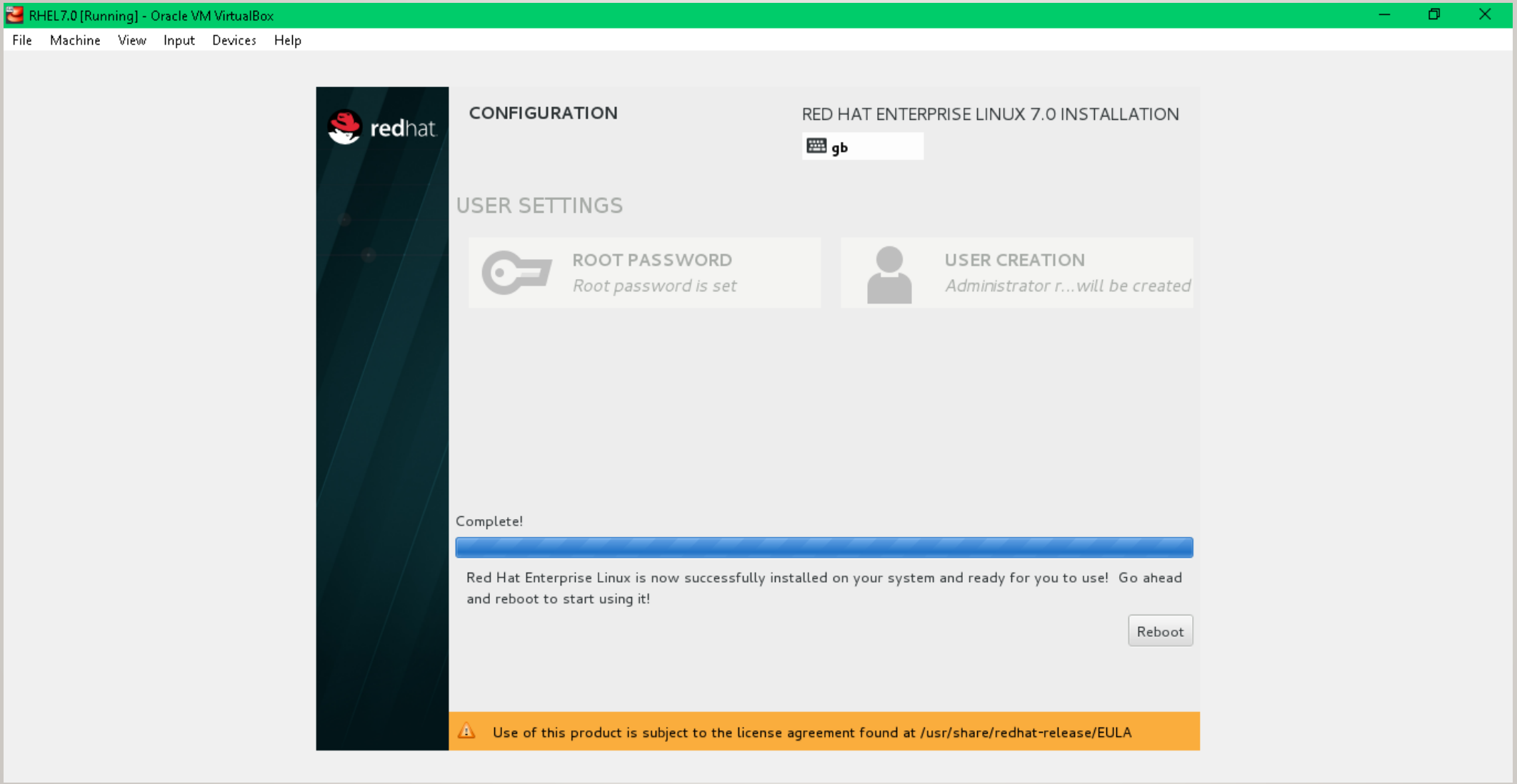
- Step 23: Adding Normal User to 'Wheel' group



- Step 24:


RHEL7.0 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
redhat
CONFIGURATION
RED HAT ENTERPRISE LINUX 7.0 INSTALLATION
gb
USER SETTINGS
ROOT PASSWORD
Root password is set
USER CREATION
Administrator r...will be created
Installing openldap (128/324)
IT'S NOT YOUR AVERAGE BLOG
Get exclusive info from Red Hatters, direct from the source.
RED HAT ENTERPRISE LINUX
rhelblog.redhat.co

- Step 25: REBOOT



- Finally after reboot you have to enter your login credentials.
- After successful Login you will get a welcome screen like a tour.
- Now you would have reached the Desktop screen.
- Press Windows key to get application search type “Terminal” press enter.
- Welcome to the world of command line

- **Next Session : Post installation configuration**