CentOS 7 Server Install

In this tutorial, I will be demonstrating a CentOS 7 install using VirtualBox 6.1.2 on a Windows 7 Pro SP1 host machine. Please note that I will be using a CentOS 7 minimal ISO image to perform a server install of CentOS 7. This means no GUI will be available post install.

I have another tutorial demonstrating the installation of the **MATE desktop** environment, accessible **here**.

Refer to the prerequisites listed below to access the download locations of the resources needed to complete this tutorial.

Prerequisites

- VirtualBox 6.1.2 & VirtualBox 6.1.2 Extension Pack
- CentOS 7 minimal ISO image can be downloaded here
- Active Internet Connection

For instructions on how to install VirtualBox and extension pack, see my **VirtualBox Install** tutorial **here**.

Steps to complete tutorial:

1. Install VirtualBox 6.1.2
2. Download CentOS 7
3. Create virtual machine
   a. Name and OS
   b. Memory Size
   c. Create Hard Disk
   d. Attach CentOS 7 ISO Image to VM
4. Install CentOS 7
5. Take Snapshot
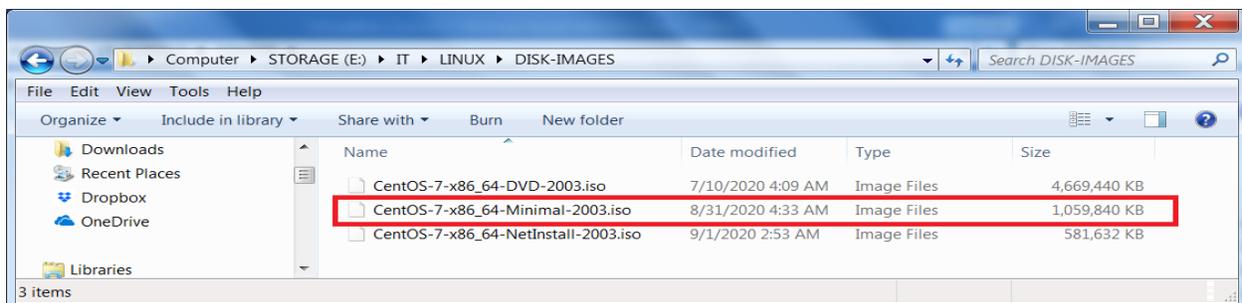
Install VirtualBox 6.1.2

If you already have VirtualBox 6.1.2 installed, go to the next step. Otherwise, please see one of my other tutorials, **VirtualBox Install**, accessible **here**, where I demonstrate the installation of VirtualBox 6.1.2, as well as, the same version extension pack.

Download CentOS 7

Click the following link to download **CentOS 7 minimal ISO image**. It will be downloaded to your local Downloads directory.

I have moved my downloads to a location where they can be easily accessible. Note, I have downloaded three versions: DVD, Minimal and NetInstall. Their sizes differ because they contain different contents. Below, I've listed the main differences:

- **DVD** – full install including GUI desktop environment
- **Minimal** – usually for server installations that require manual configurations
- **NetInstall** – boot DVD for installing from a network server
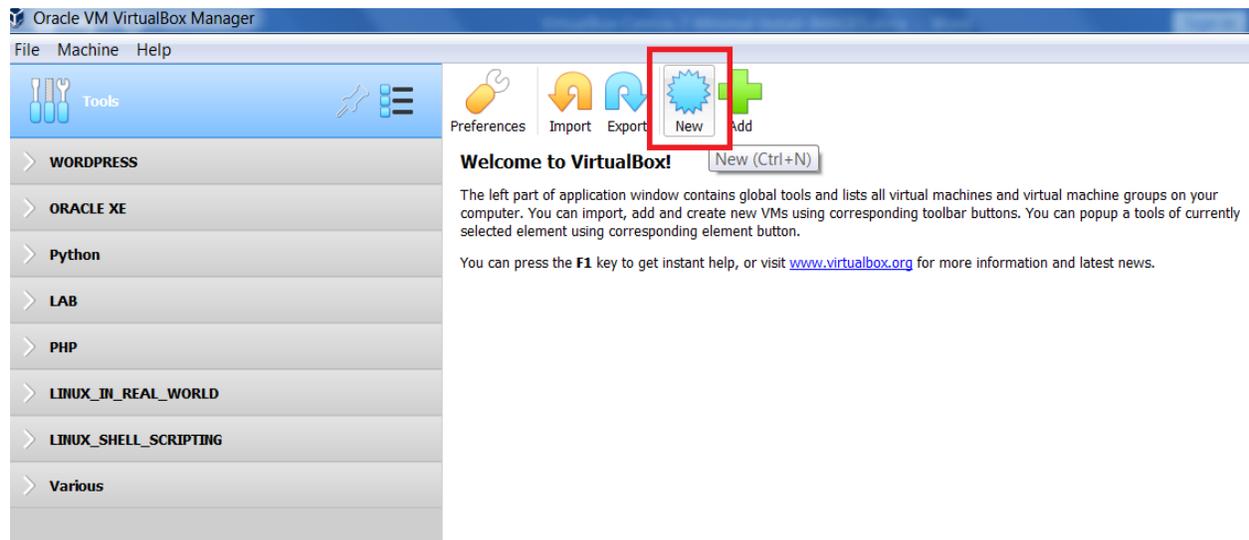
Create virtual machine

Now that we have our CentOS 7 minimal ISO image, we will create a virtual machine to be used for the CentOS 7 install.

*Please note that if you have just installed VirtualBox 6.1.2, you will only see "**Tools**" on the left-hand side of the VirtualBox Manager interface. I have already created a number of VMs (virtual machines) and grouped them for organizational purposes.*

On the VirtualBox Manager interface, click the **New** button to start the creation of a new virtual machine.

Name and OS

The "**Create Virtual Machine**" screen appears.

- Give your VM a name (I named my VM: **centos7-VM**)
- Choose where you want the machine created on your host system

*Please note, you can change the destination folder ("**Machine Folder:**"), if the default does not work for you.*
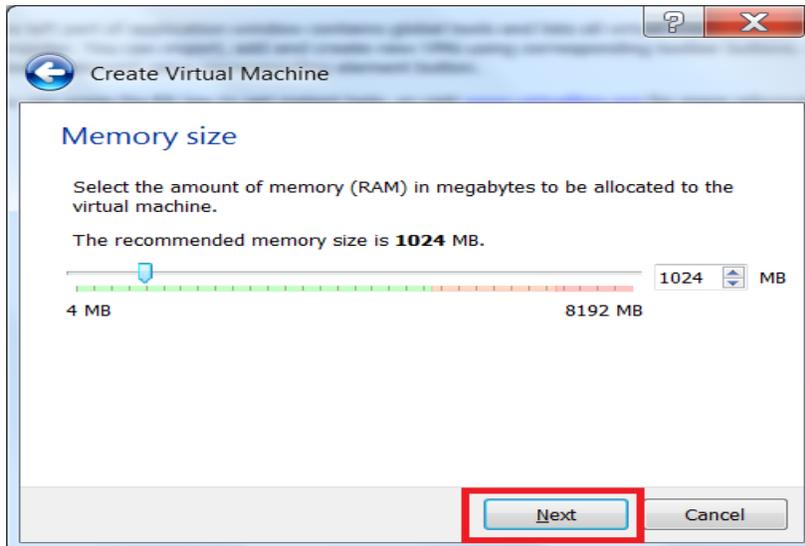
This will be where the virtual machine files are stored on your host system.

- Ensure Type is set to **Linux** and Version is set to **Red Hat (64 bit)**, click **Next**
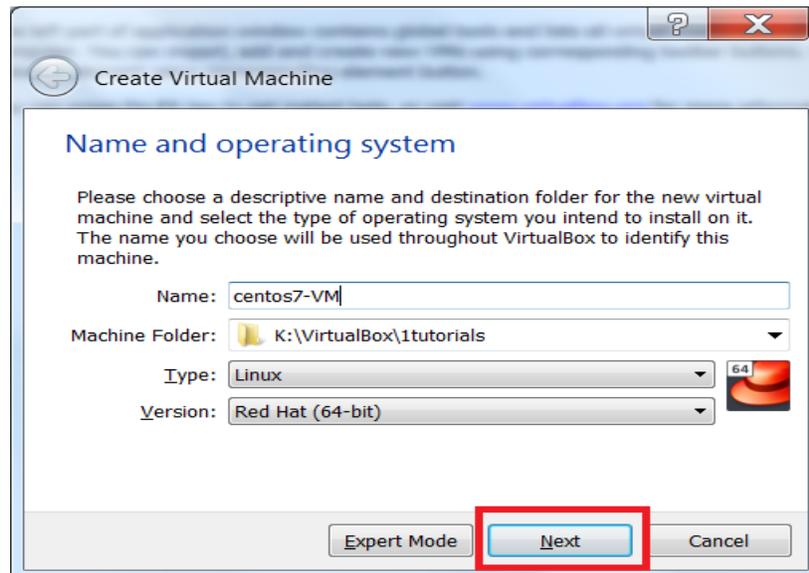
Memory Size

The next screen asks for the amount of memory (**RAM**) you wish to allocate to this machine.

Since we are performing a minimal server install, 1024MB (1GB) of RAM is sufficient. Click **Next**


Create Hard Disk

Now we must create a virtual hard disk where the CentOS 7 operating system will be installed.

Note the recommended size (8 GB) of a virtual hard disk for CentOS 7. Click **Create**
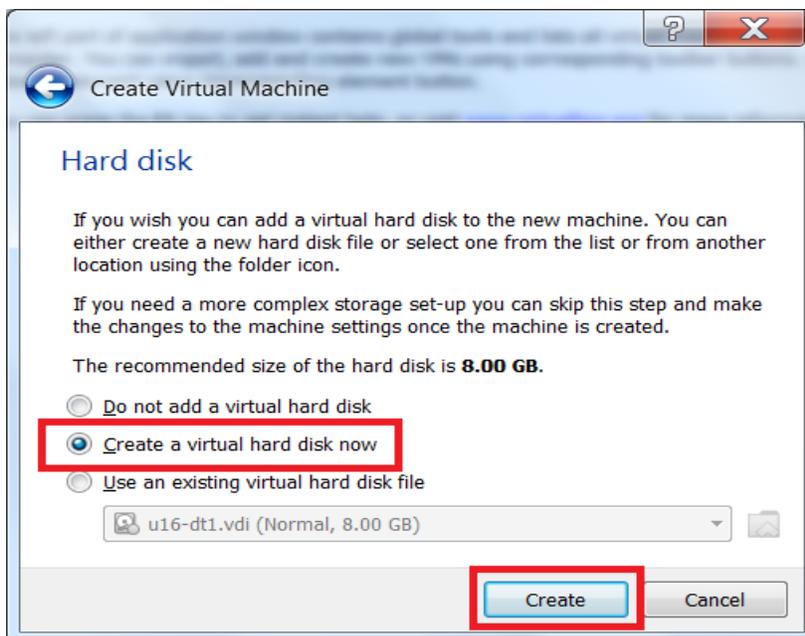
Now, you will have to choose the type of virtual hard disk. Select **VDI** and click **Next**

- • **VDI**: Oracle VirtualBox container format for guest hard disks.
- • **VHD**: Microsoft container format
- • **VMDK**: VMWare container format
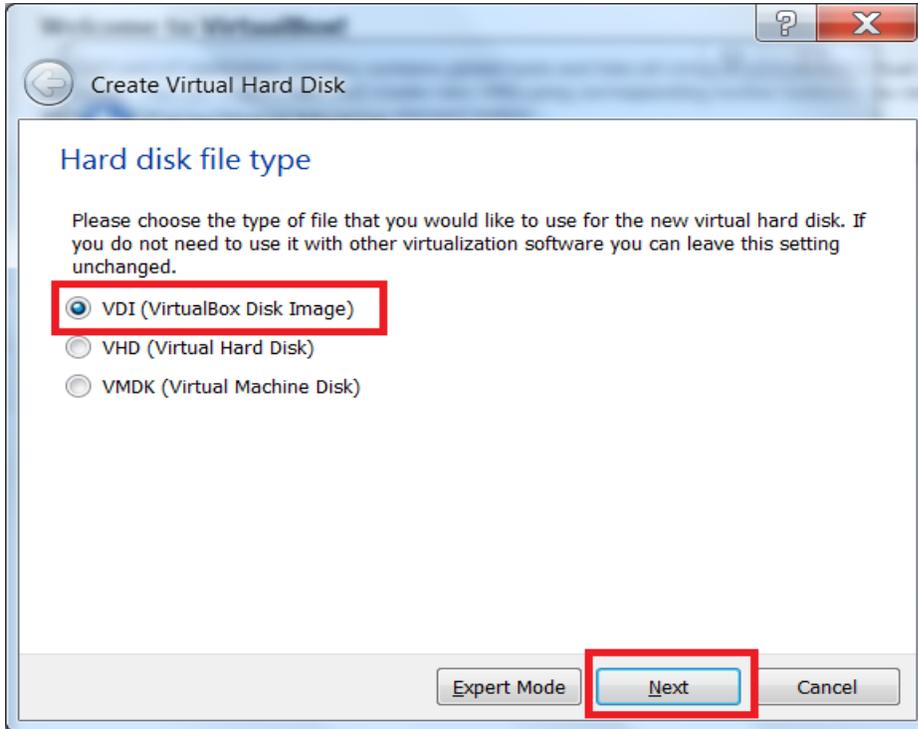
We can now choose whether the virtual hard disk takes up the size we allocate as needed (Dynamically allocated) or immediately (Fixed). To save space on my host system, I will be choosing "**Dynamically allocated**" and clicking **Next**
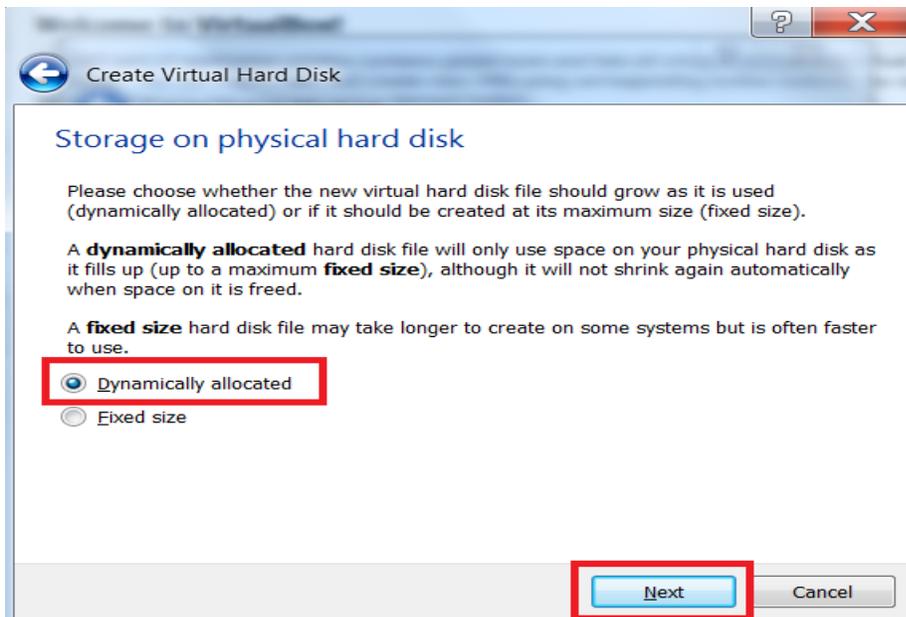
Here we can set the virtual hard disk size. Note it's name and storage location. Again, since we're performing a minimal install, 8.00GB is enough. Click **Create**
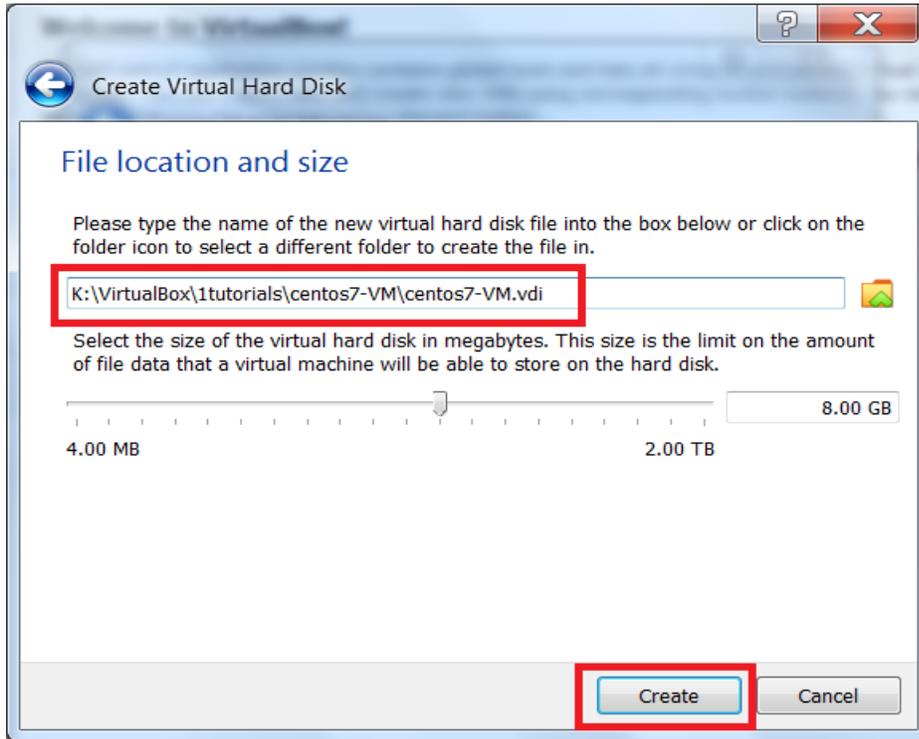
As you can see below, the **centos7-VM** virtual machine was successfully created.

Again, please note that, as I mentioned earlier, our VirtualBox Manager interfaces (left side listing VMs) will not be identical because I already have a number of grouped virtual machines.
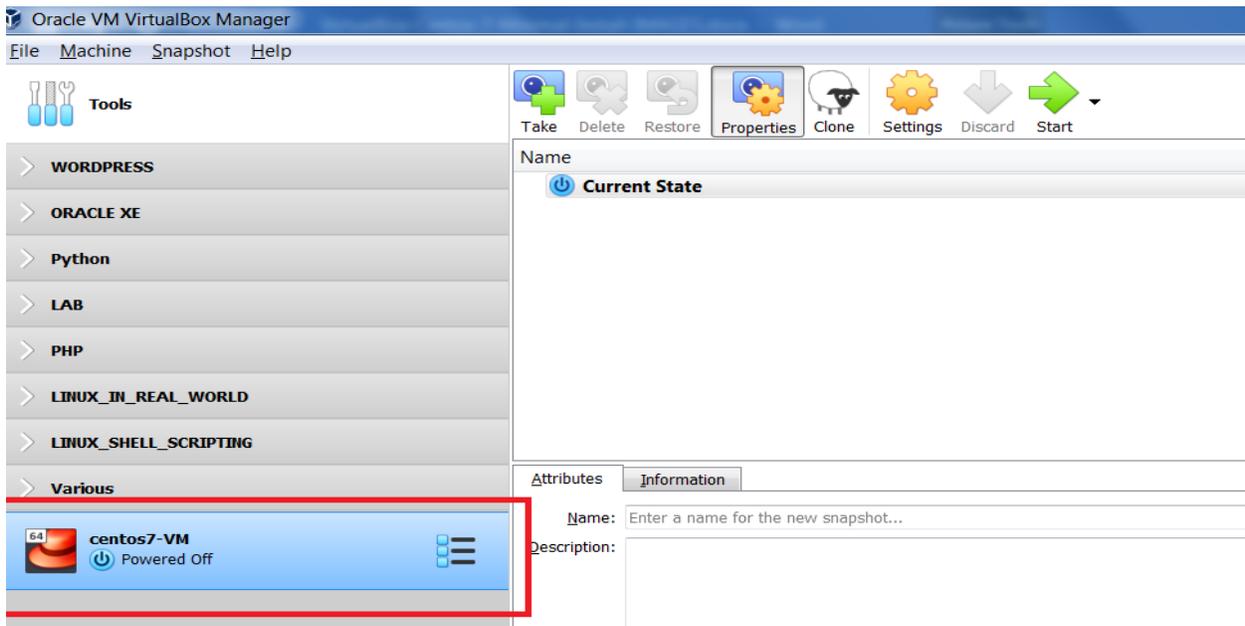
After creating my virtual machine I was brought to the VirtualBox Manager interface's **Snapshots** view . If you are already in the **Details** view, you can just read on to see how to switch views.

To switch to **Details** view, click the list icon next to the virtual machine name, and select **Details**.
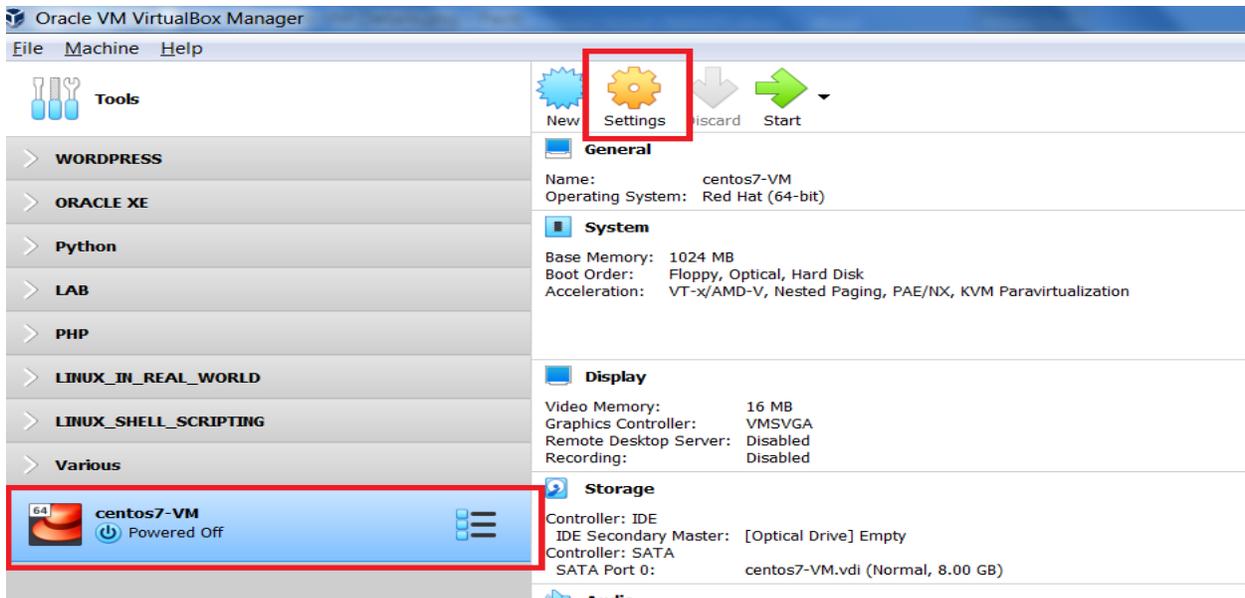
The **Details** view will provide you with a listing of all the configurable components of the VM.
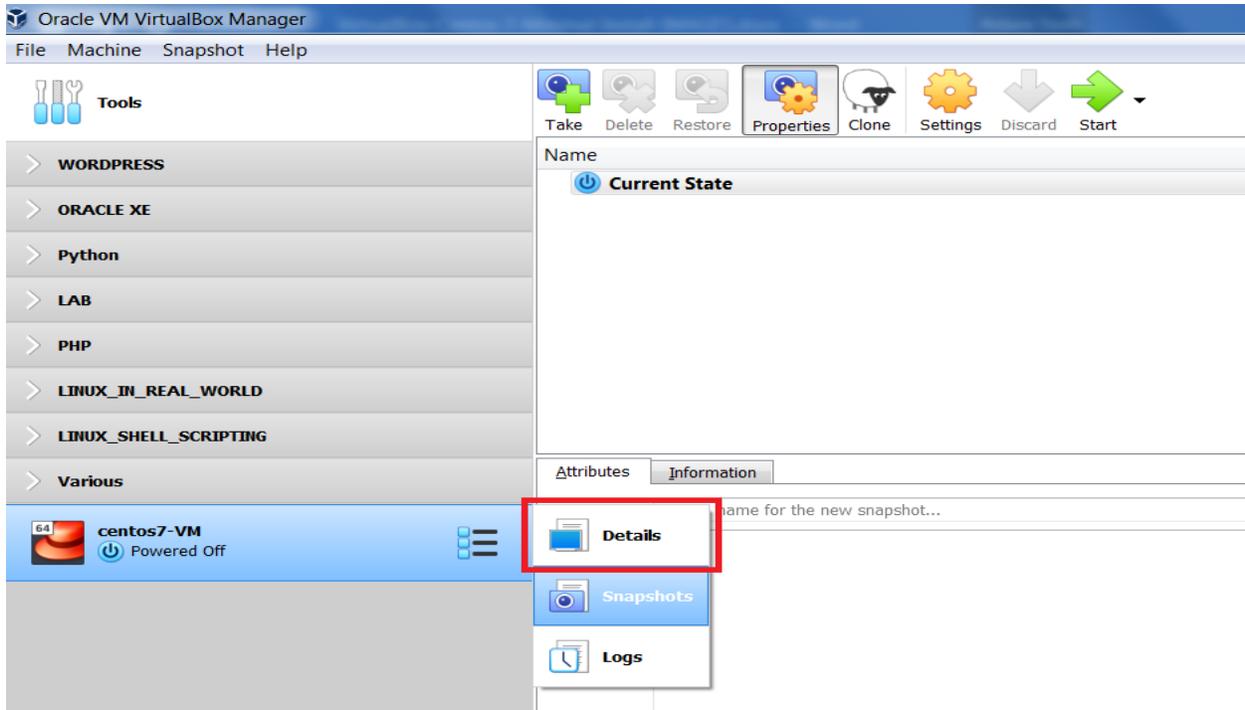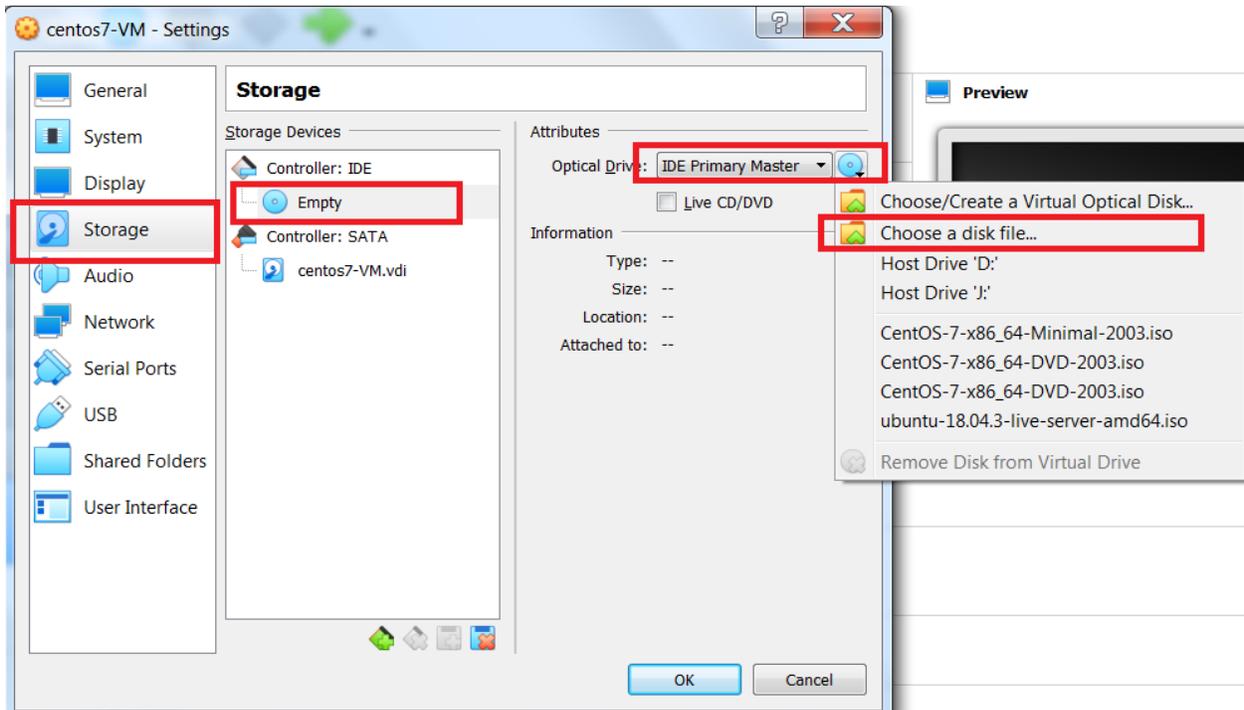

Attach CentOS 7 ISO Image to VM

Now we will configure the VM's optical drive with the CentOS 7 minimal ISO image we downloaded earlier.

On the VirtualBox Manager interface, ensure your newly created VM is selected and click the **Settings** button.

In the VM Settings dialog box, on the left, select **Storage**. You'll notice that the virtual optical drive is **Empty**.

Ensure the **Empty** optical drive is selected. Then, on the right, ensure "**IDE Primary Master**" is selected. Then, click the optical drive icon and click "**Choose a disk file**" to select the Centos 7 minimal ISO image that was downloaded as a prerequisite for this tutorial.

Please note that if you do not set the VM's optical drive to "**IDE Primary Master**", and you leave the default of "**IDE Secondary Master**", when you start the VM you will be prompted to attach a disk file to begin the installation.

Browse to where you've downloaded the CentOS 7 minimal ISO image, and click **Open**
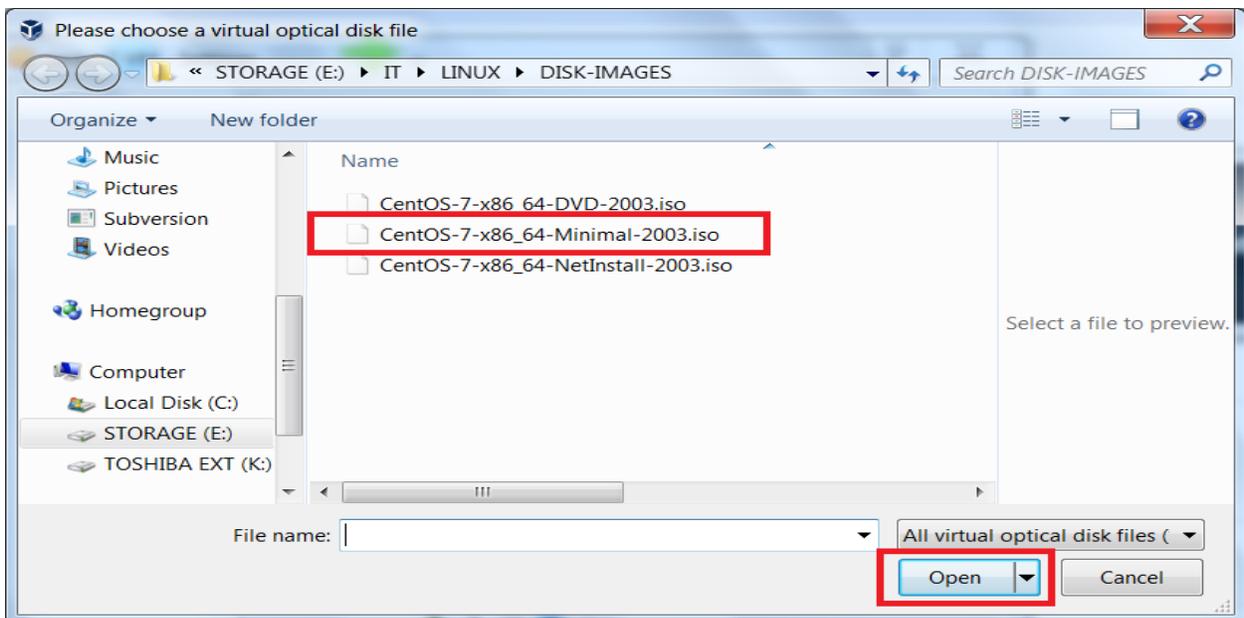
By attaching the CentOS 7 minimal ISO image to the virtual machine's optical drive, our installation media is set and we are now ready to start our new VM (virtual machine) and begin the installation of CentOS 7.
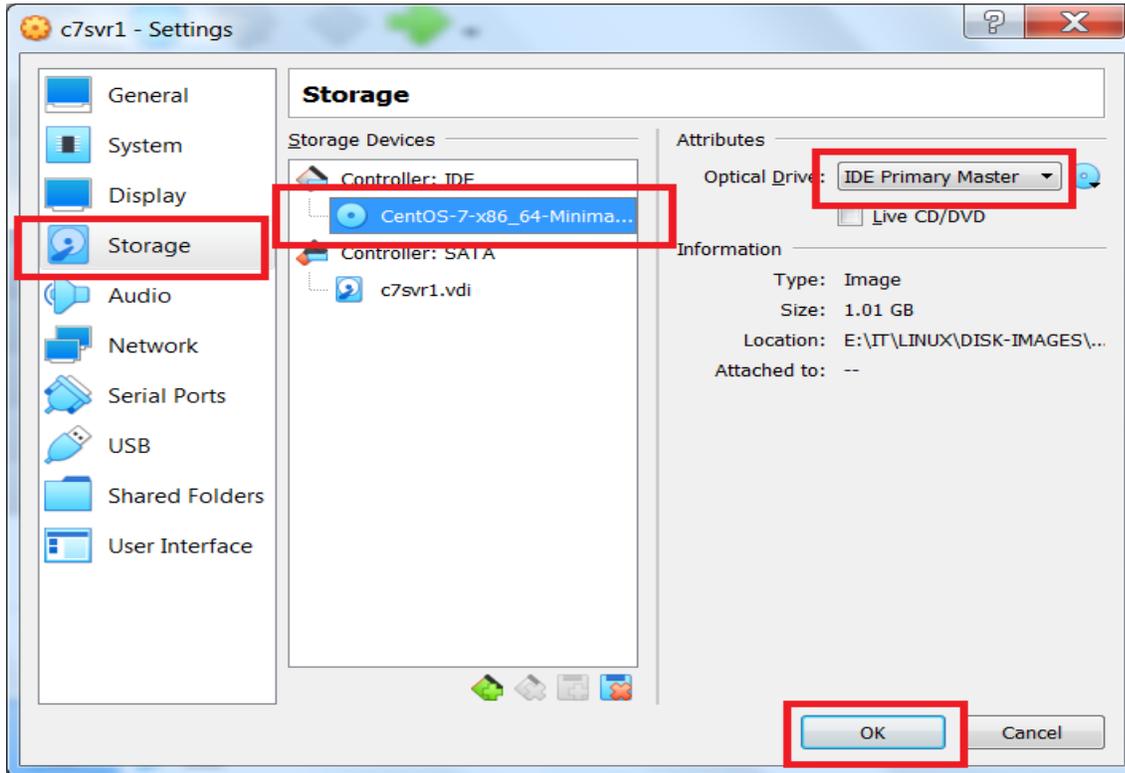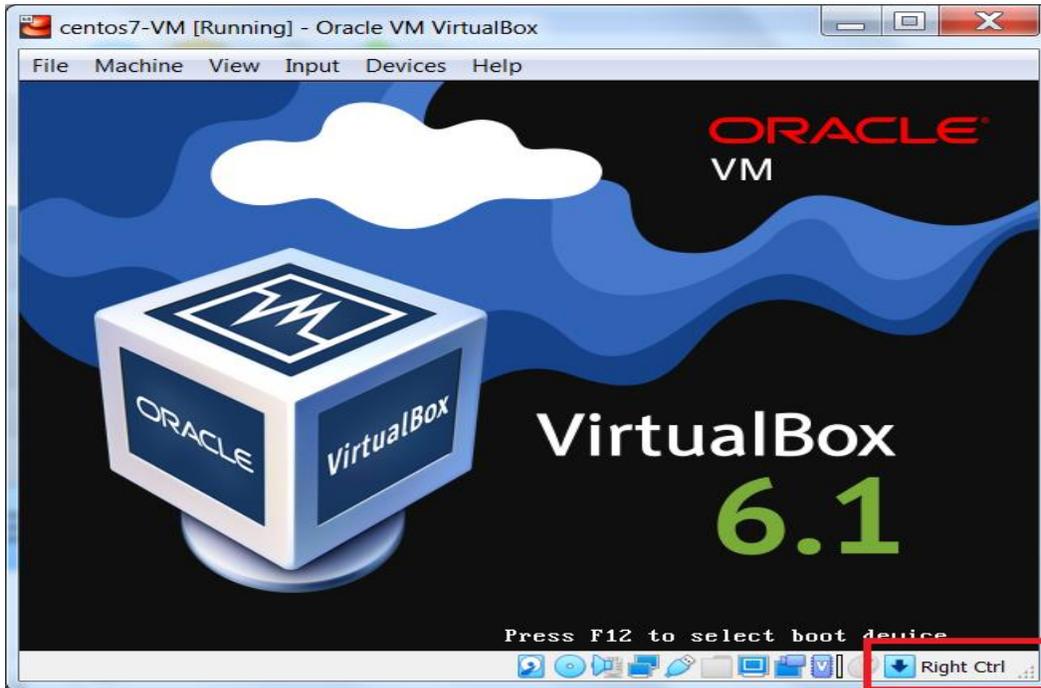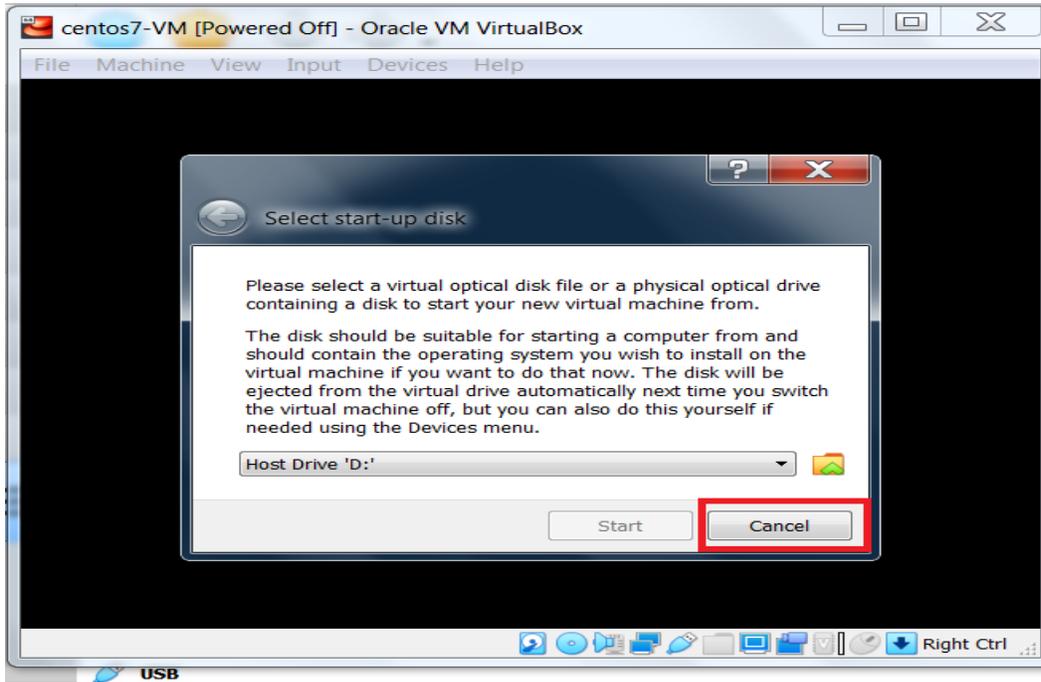

Install CentOS 7

On the VirtualBox Manager Interface, ensure your new VM is selected and click **Start**
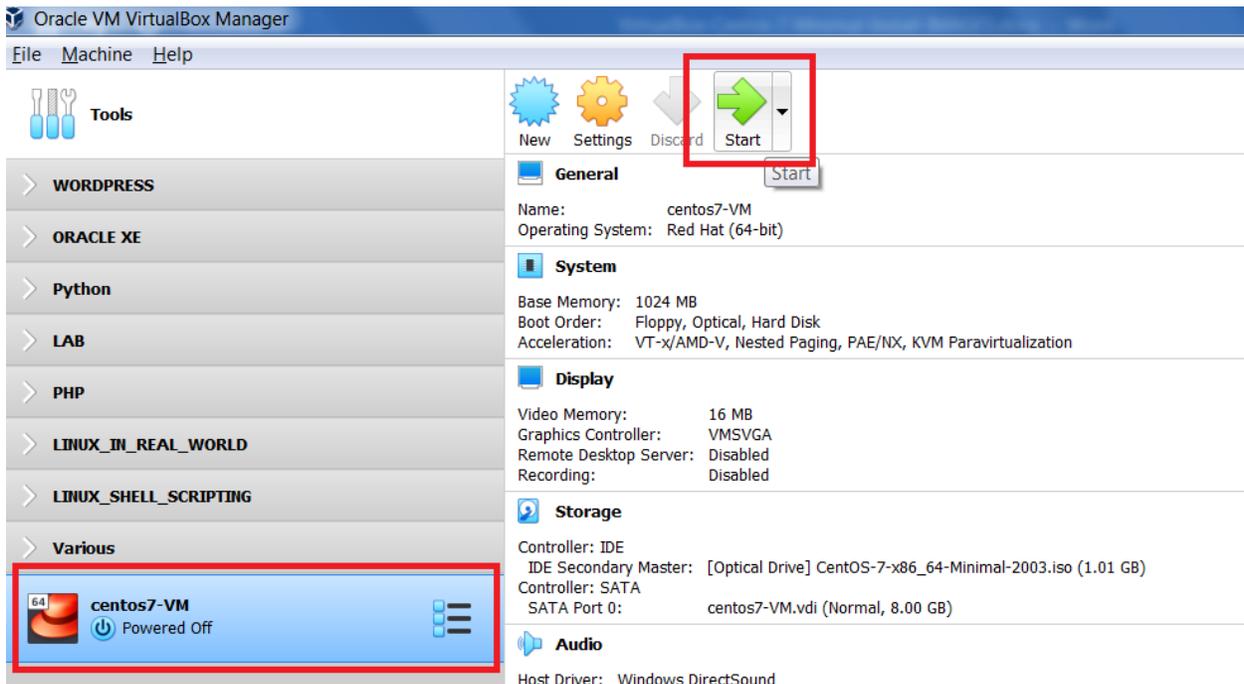
Friendly Reminder: During installation, if at any time you need to exit the **guest** (virtual machine) interface and return to the **host** machine interface, hit your **Host key** (for Windows 7, it's the **right Ctrl key**). Check the bottom right-hand corner of the virtual machine's interface (see image below).
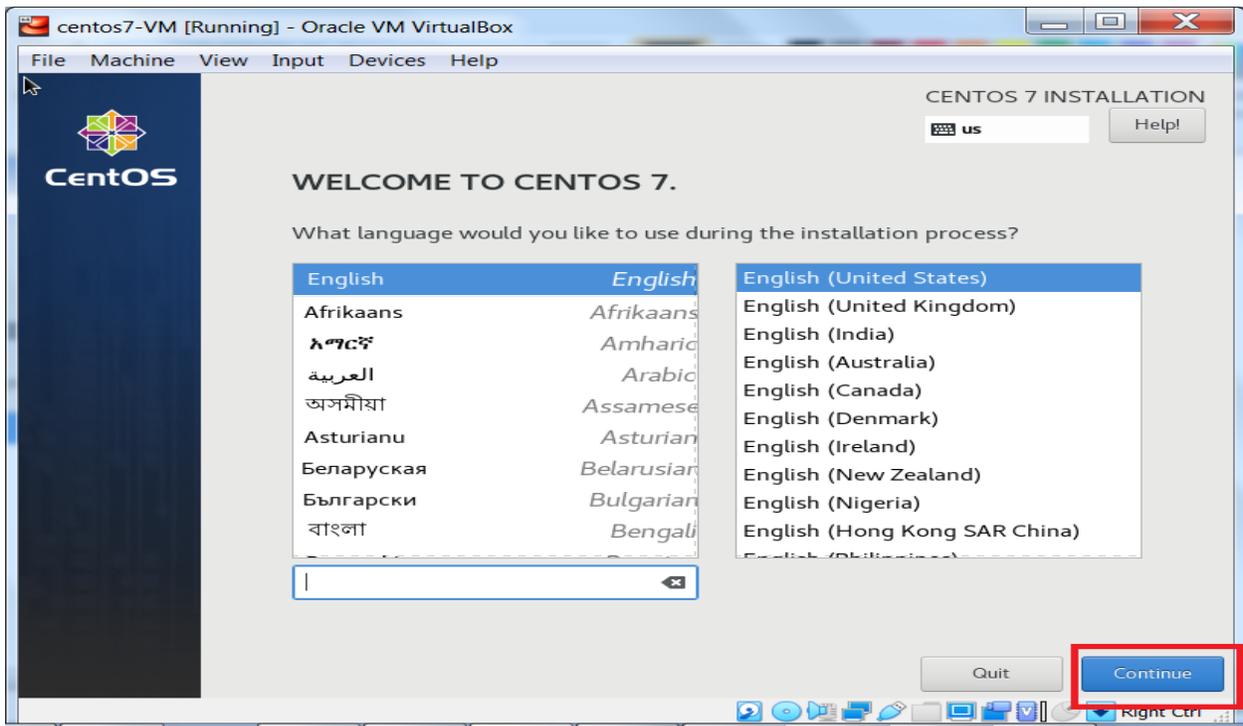

Even if you've set your VM's optical drive to "**IDE Primary Master**", you might still be prompted with the "**Select start-up disk**" screen on start-up. If you are, just click **Cancel** to continue.

Next, navigate up to "**Install CentOS 7**" and, on your physical keyboard, hit the **Enter** key to begin the installation.
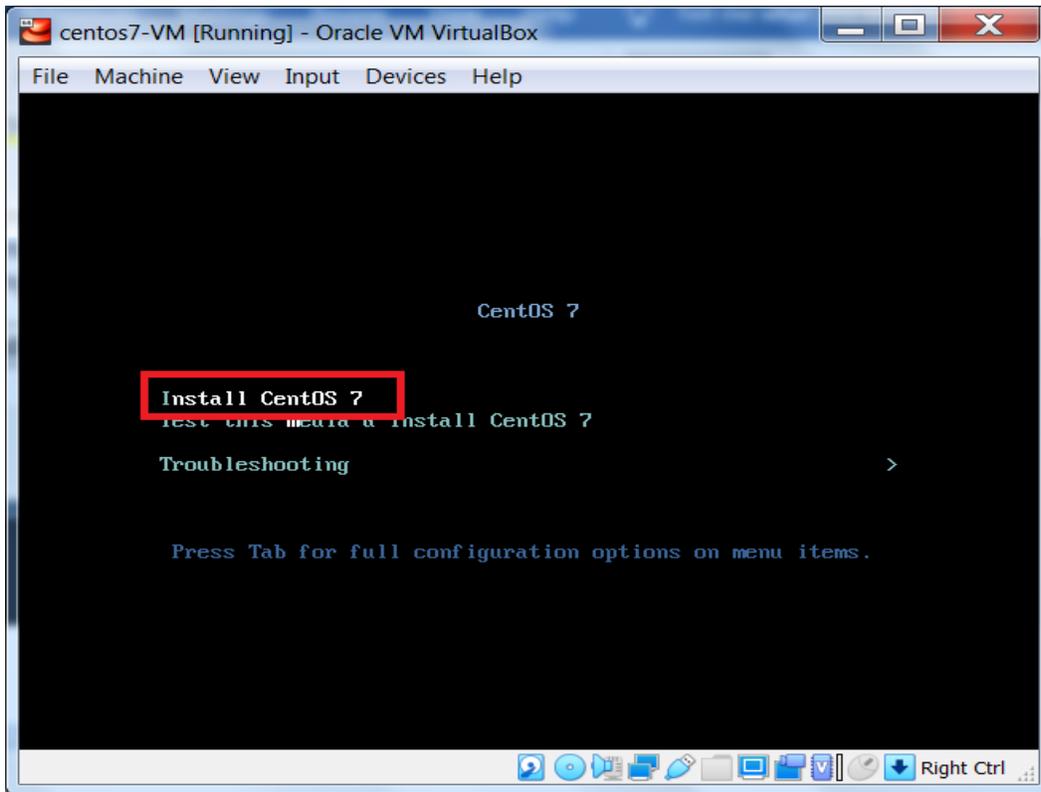
Select your desired language and click **Continue**

On the **Installation Summary** page, we need to configure a few settings before we can begin the installation.

Localization:

        timezone, keyboard and language

Software:

        Installation source and software selection

System:

        Installation destination (includes partitioning)

        Network & Host name

        KDump & Security Policy

Please note that before we begin making the required pre-installation configuration changes, I will be referring to the items listed on the "**Installation Summary**" page (see items above OR image below). Also, if the correct item value is already set, you do not need to change it.

According to my "**Installation Summary**" page, only two items need to be configured. Under the "**System**" section, they are "**Installation Destination**" and "**Network & Host Name**".

If your "**Installation Summary**" page is the **same** as mine, please skip to the System section.

If your "**Installation Summary**" page is **different** than mine, links to each section are available here:

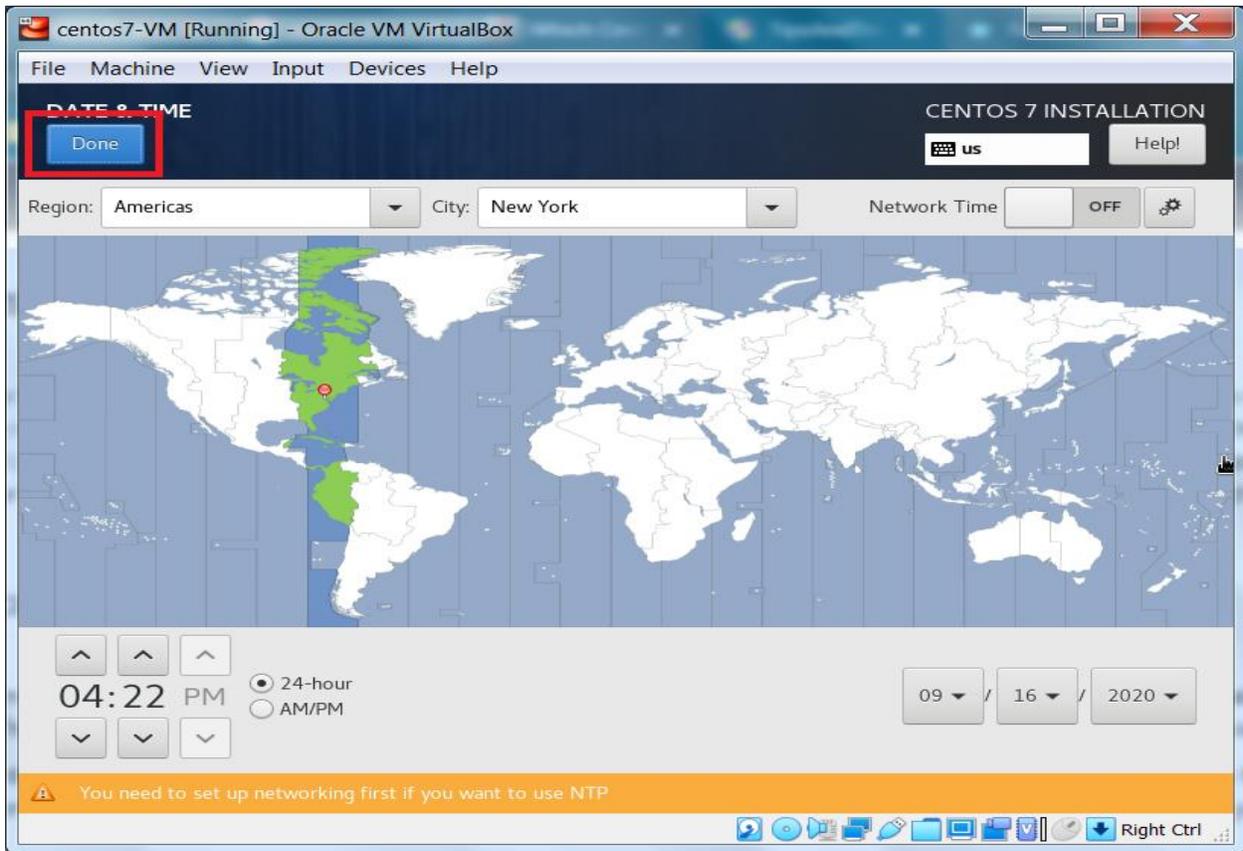Localization, Software and System
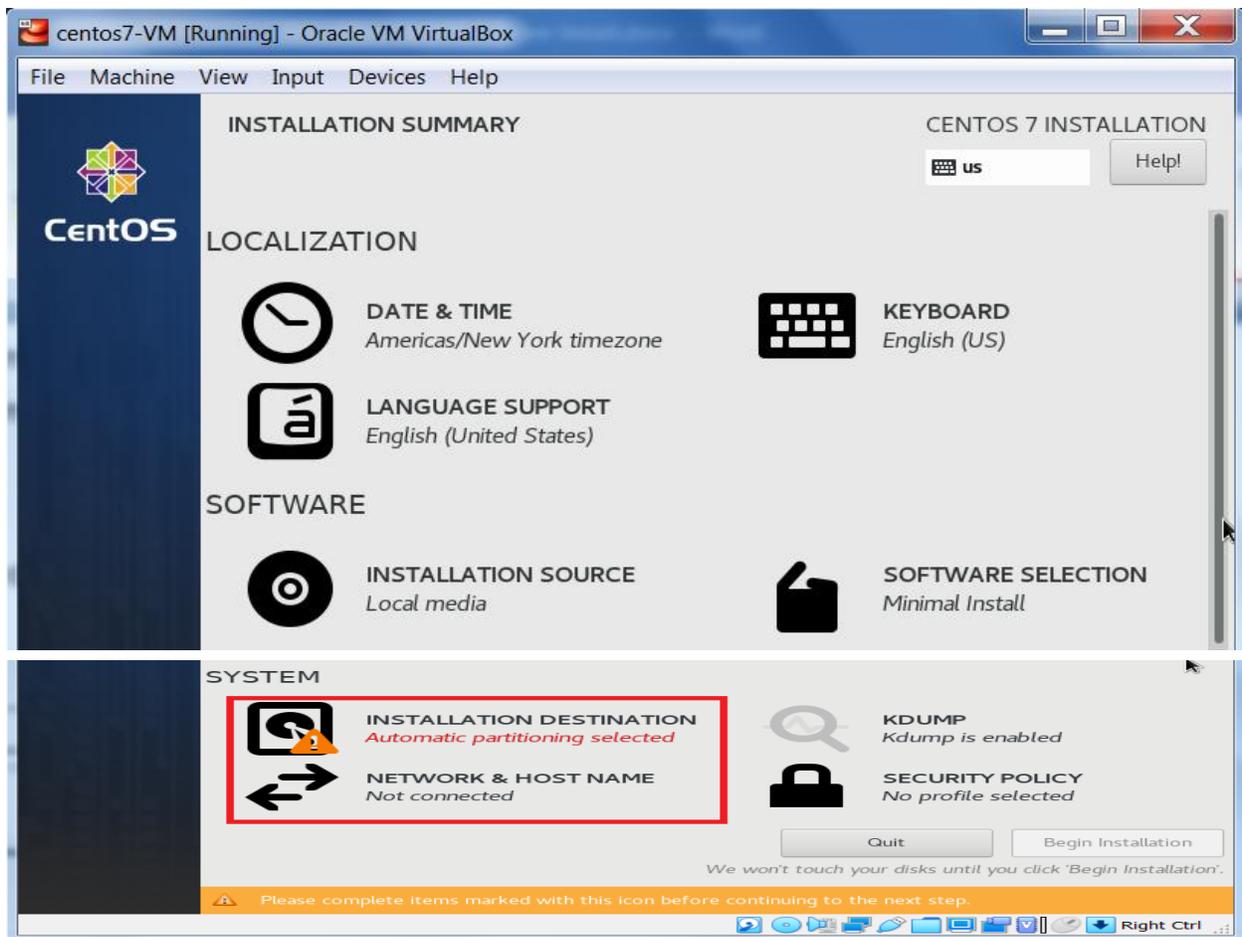
To be thorough, we will go through each configuration screen for every item that is listed on the "**Installation Summary**" page. That way you will become familiar with a CentOS 7 installation.
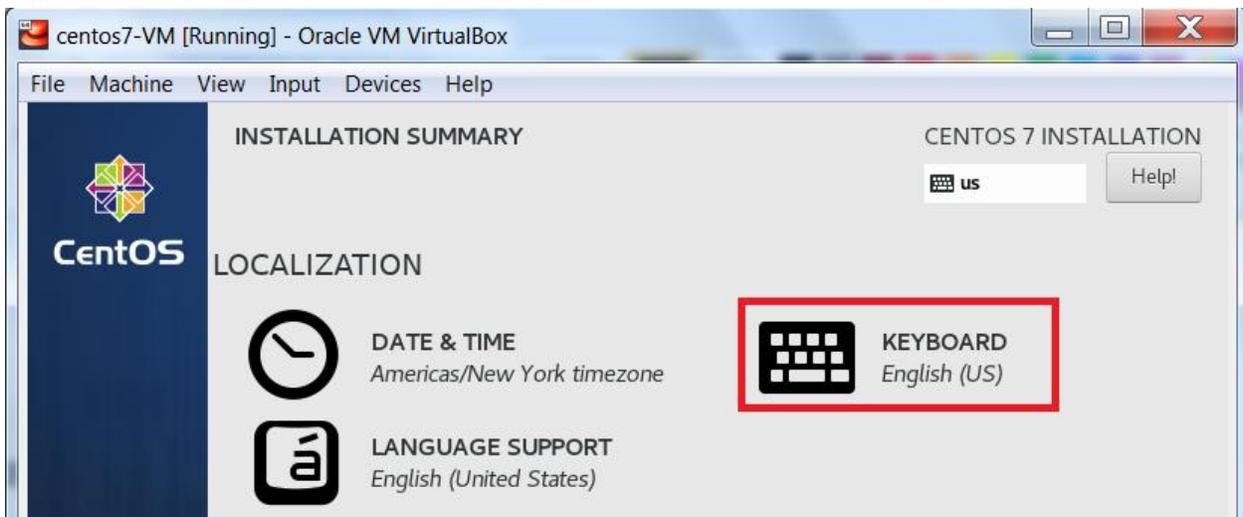
Localization

To set your timezone, from the "**Installation Summary**" page, click "**Date & Time**".
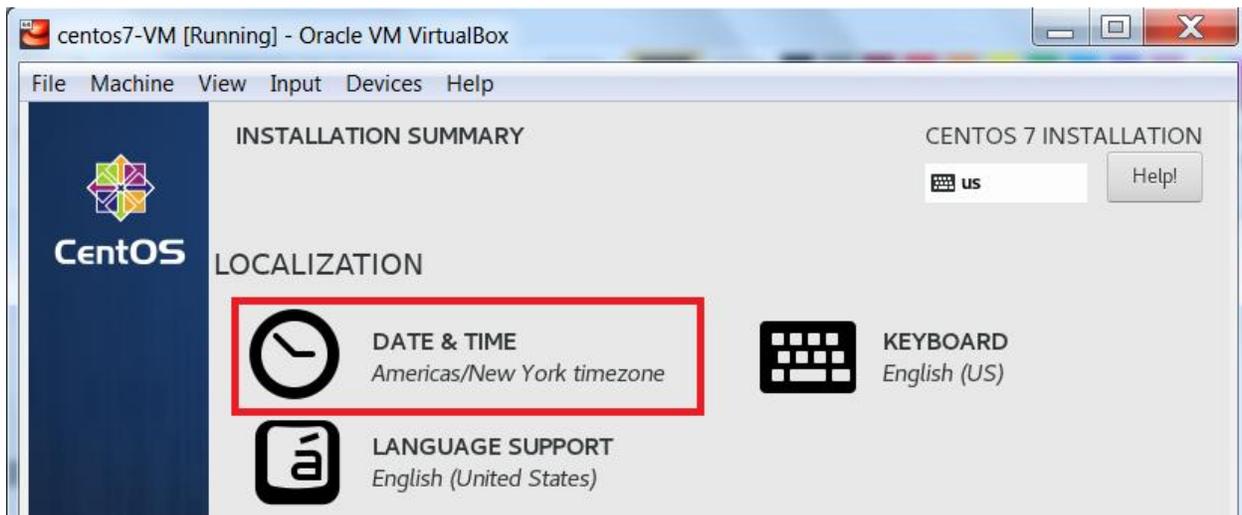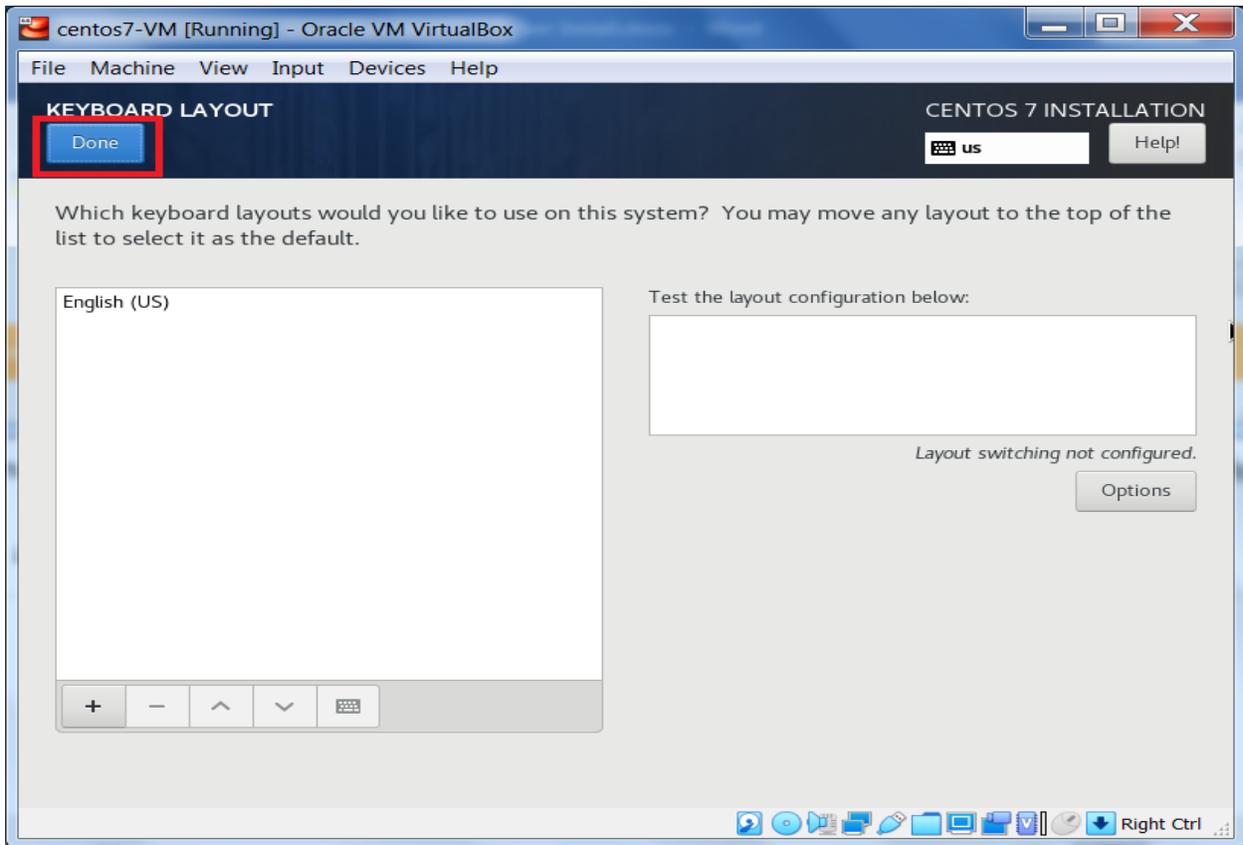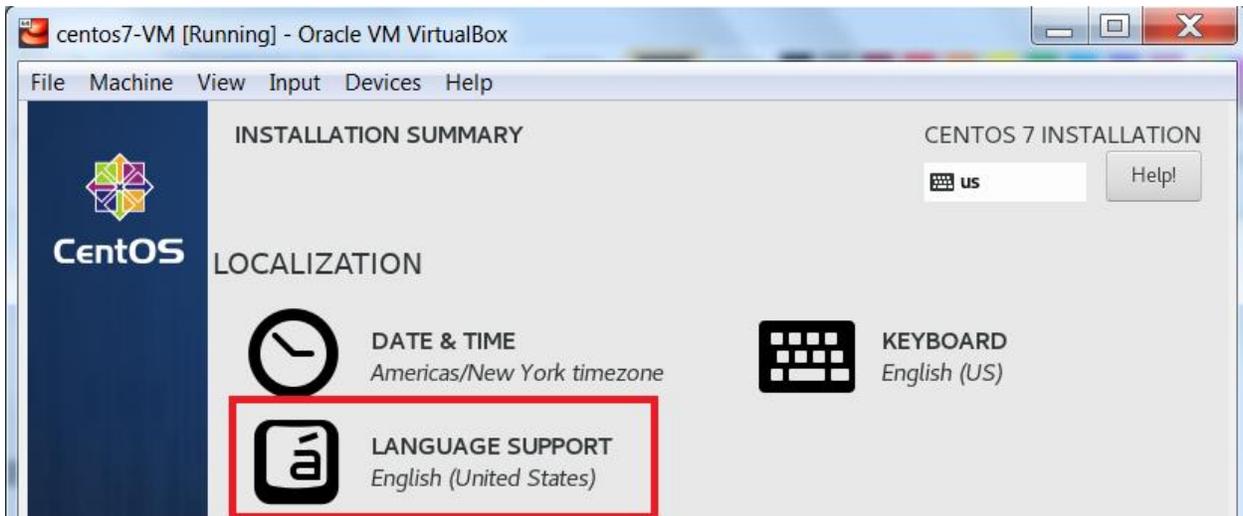
Make your change, if needed, and click **Done**.

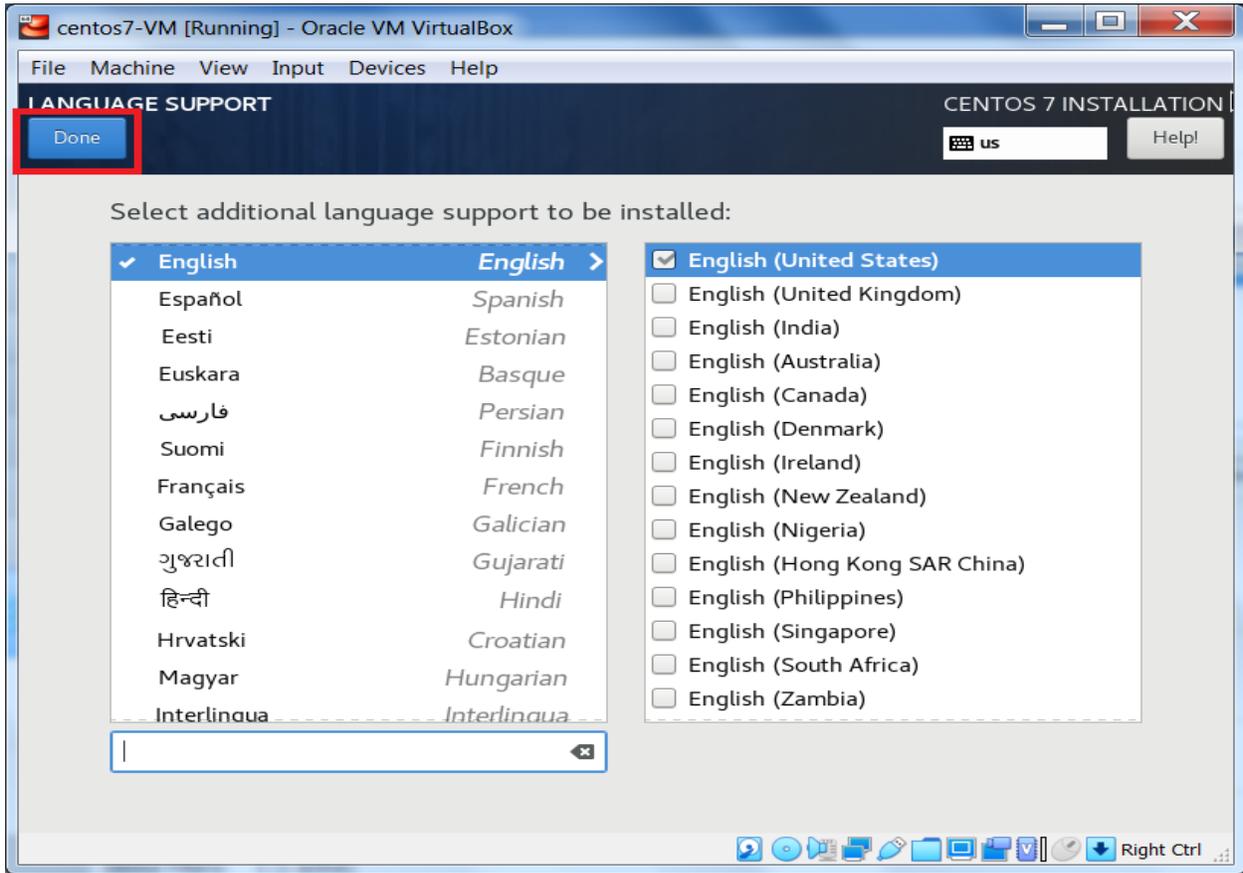To set your keyboard, from the "**Installation Summary**" page, click "**Keyboard**".

Make your change, if needed, and click **Done**.

To set your language, or to add language support, from the "**Installation Summary**" page, click "**Language Support**".
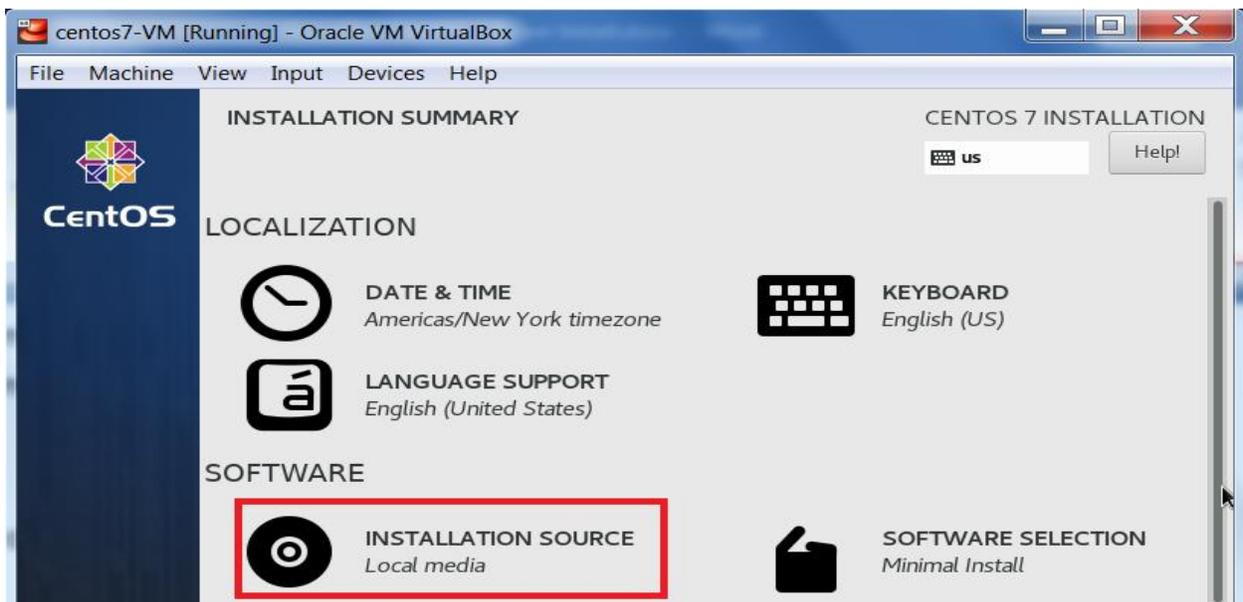
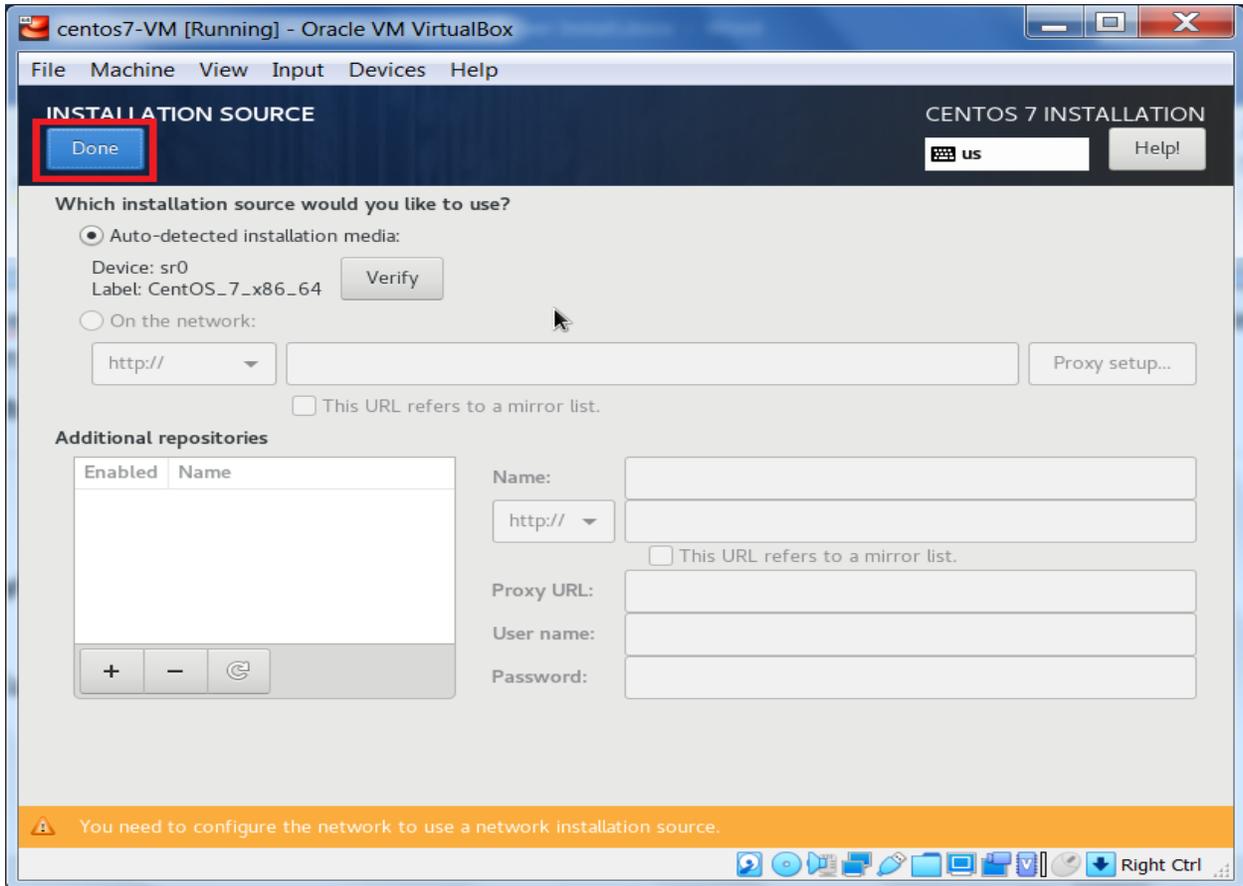If needed, set your language and add support for other languages and click **Done**.

Software

Next, from the "**Installation Summary**" page, under "**Software**", click "**Installation Source**".

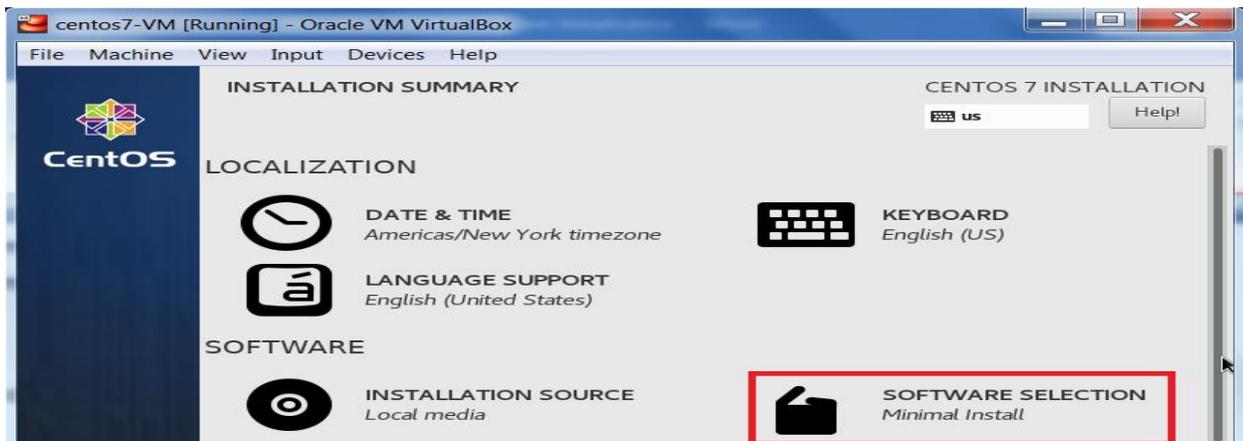If needed, make your changes and click **Done**.

*In my case, the "Installation Source" was auto-detected as local media (CentOS 7 ISO image attached to VM).*

Since we are using a CentOS 7 minimal ISO image, the "**Software Selection**" is set to "**Minimal Install**".

But, again, to be thorough, from the "**Installation Summary**" page, under "**Software**", click "**Software Selection**"

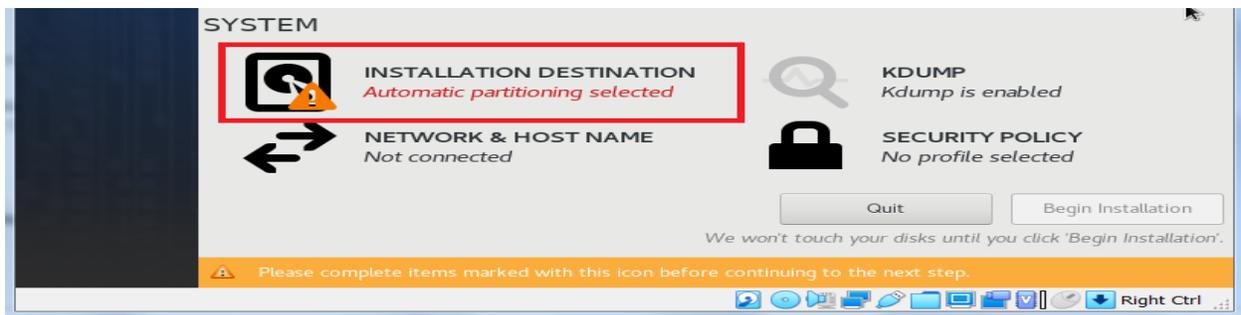Only the packages for a **CentOS 7 Minimal Install** are included in the minimal ISO image we are using.

To continue, click **Done**.
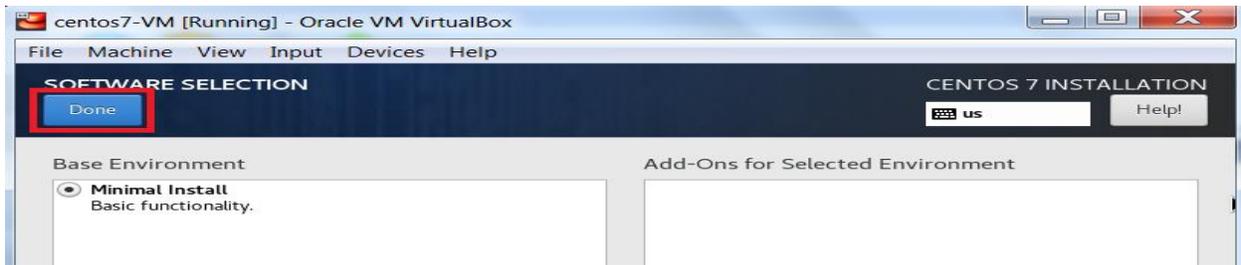
System

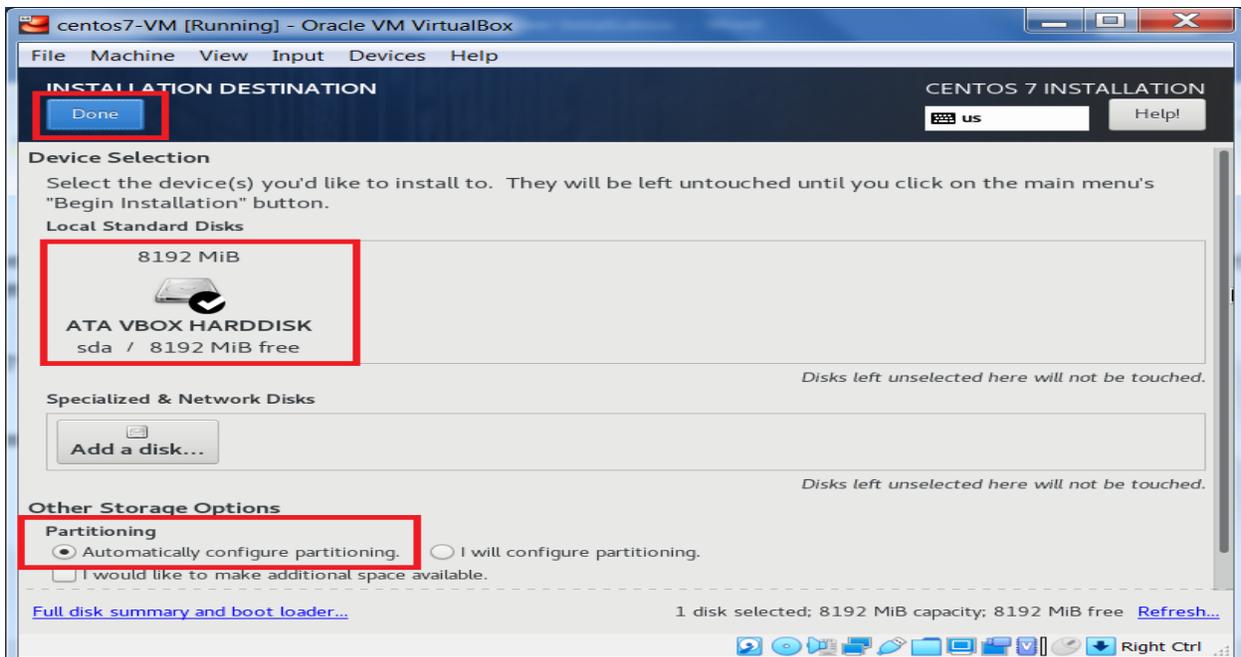Please note that the following CentOS 7 pre-installation configuration is **required**.

From the "**Installation Summary**" page, under "**System**", click "**Installation Destination**".

Ensure the virtual hard disk we added while creating the virtual machine has been detected and that "**Automatically configure partitioning**" is selected. When finished, click **Done**.

For this tutorial, we will not be manually creating our partitions. This will be done automatically for us.

*The **/boot**, **/** (root) and **swap** partitions will be created. The / (root) and swap partitions will reside in separate **LVM** logical volumes using the **xfs** file system, while, the /boot partition will also use the **xfs** file system but will be on a standard partition.*

Please note that the following CentOS 7 pre-installation configuration is **required**.

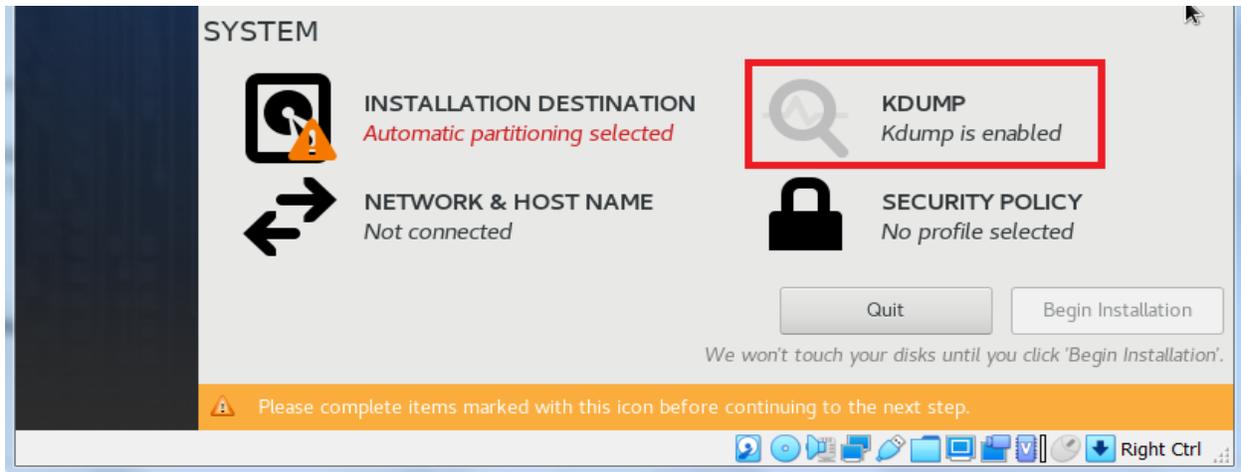From the "**Installation Summary**" page, under "**System**", click "**Network & Host Name**".
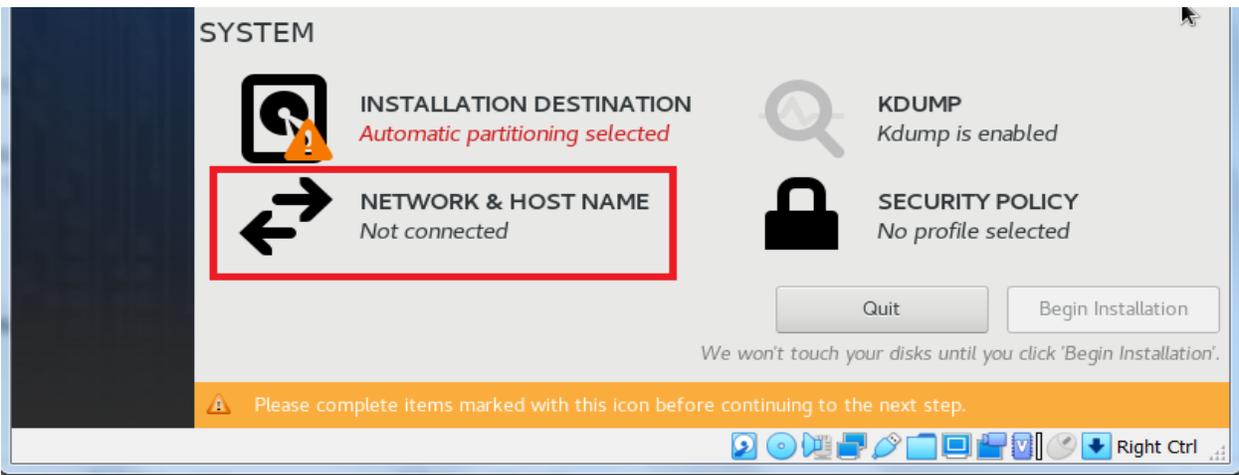
We will have to configure our IP address information and hostname. First, ensure the network adapter is selected and enable it by changing the toggle switch, on the right, from OFF to **ON**. This will ensure that our VM receives an IP address, subnet mask and default gateway from VirtualBox's DHCP service (usually 10.0.2.15 /24).

Second, enter the host name. To keep it simple, I entered "**centos7-VM**" and clicked **Apply**. Finally, click **Done**.
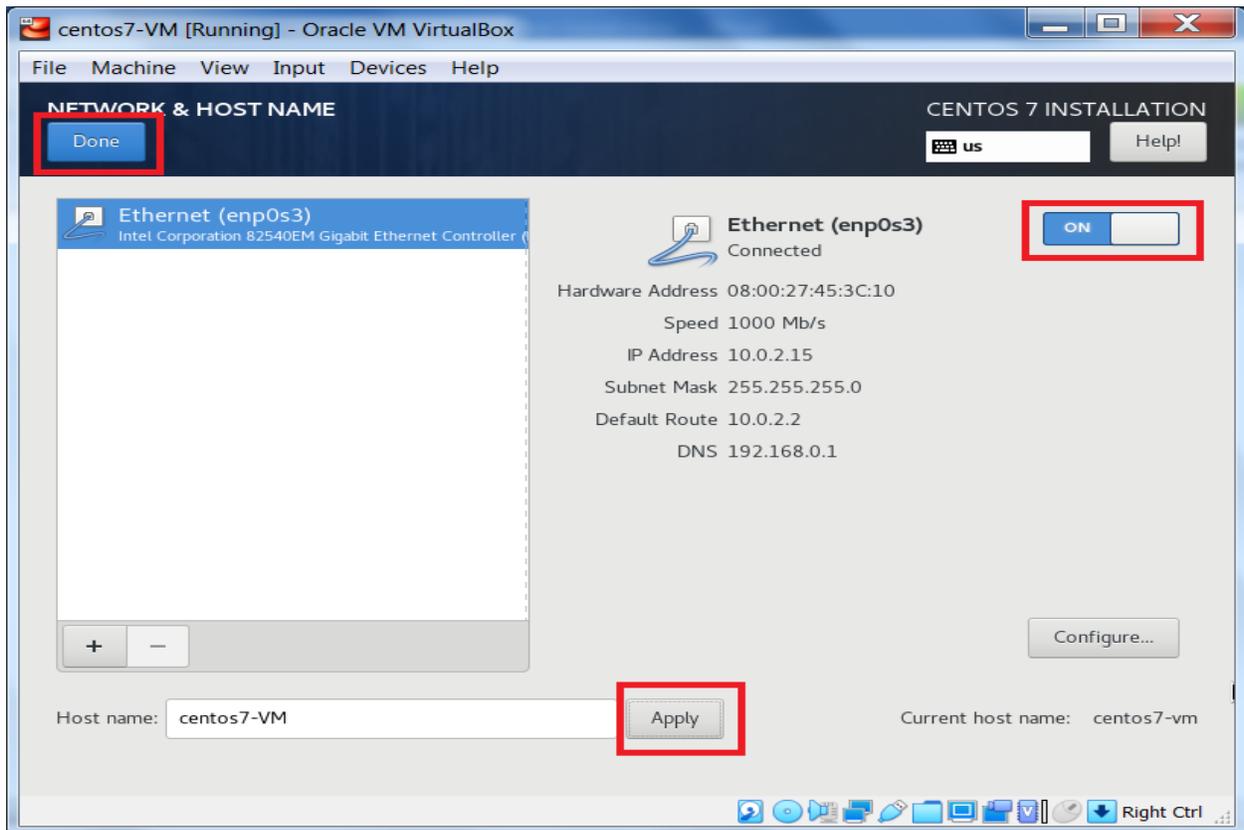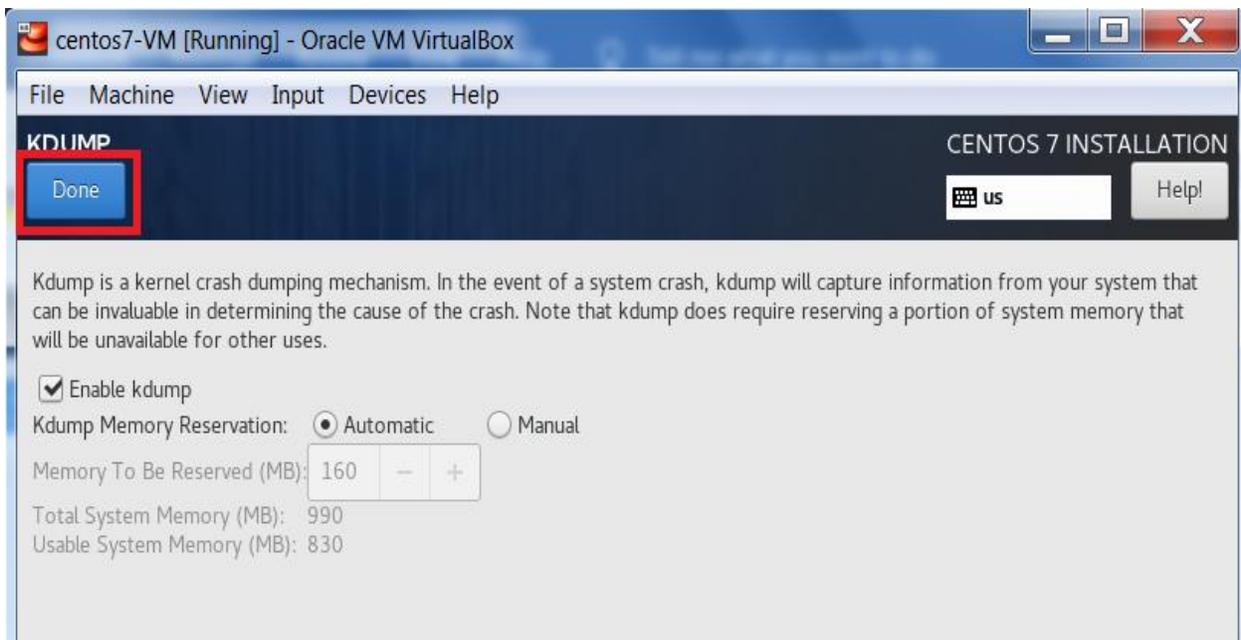
For this tutorial, we will leave "**KDump**" enabled. To be thorough, let's open the configuration screen.

From the "**Installation Summary**" page, under "**System**", click "**KDump**"

KDump captures information during a kernel crash and the information can be used to determine the cause.
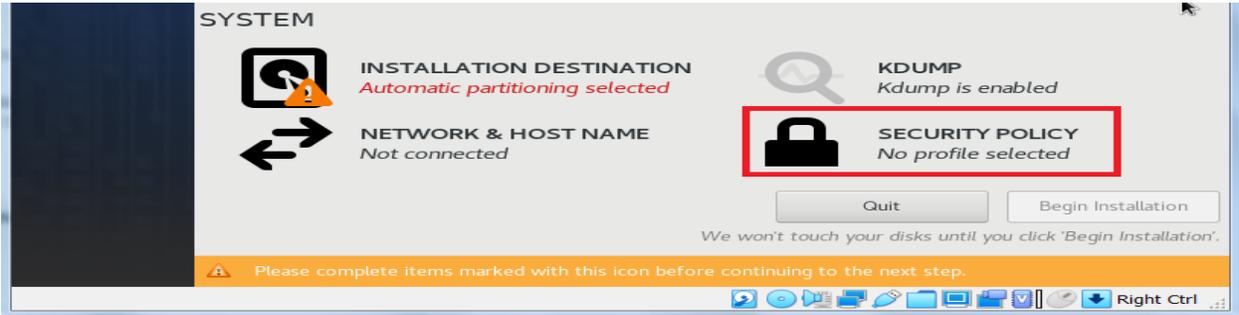

When you are done, click **Done**

We will not be setting a **Security Policy**. Again, to be thorough, let's open the configuration screen.

From the "**Installation Summary**" page, under "**System**", click "**Security Policy**"
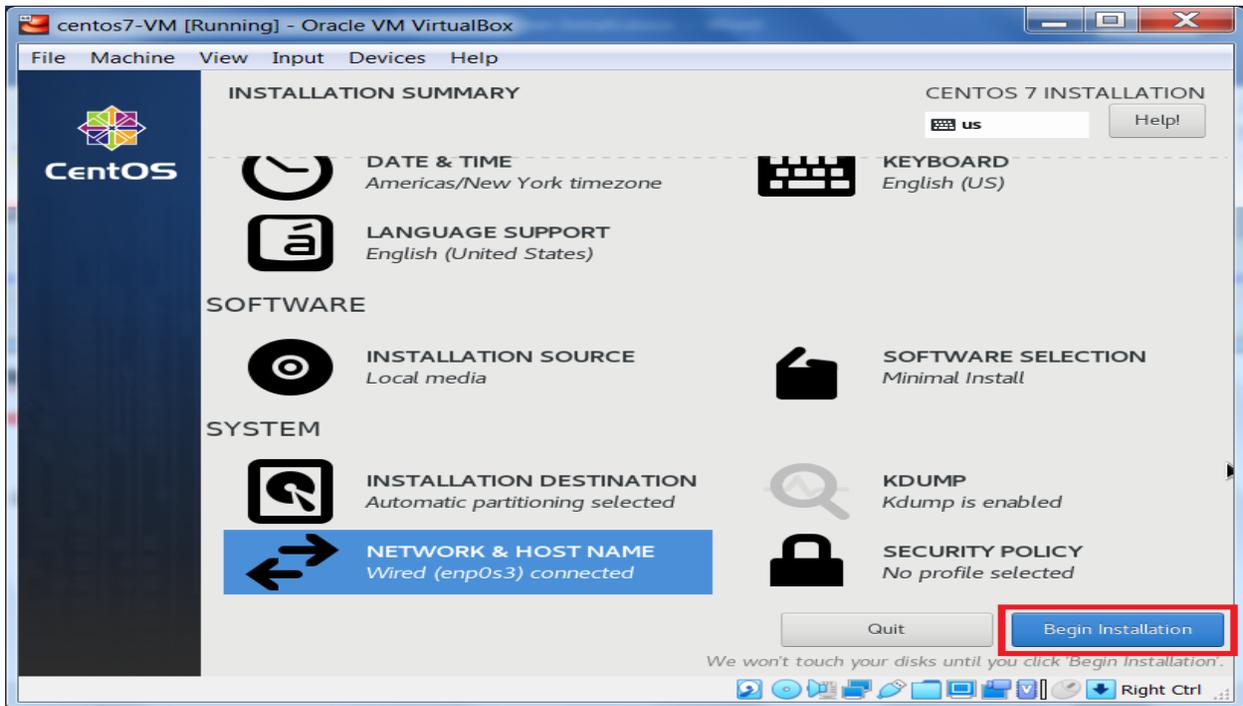
*When no **security policy** is set, the **sshd** and **firewalld** services are active, and running. Remote access using **ssh** is allowed through the firewall.*
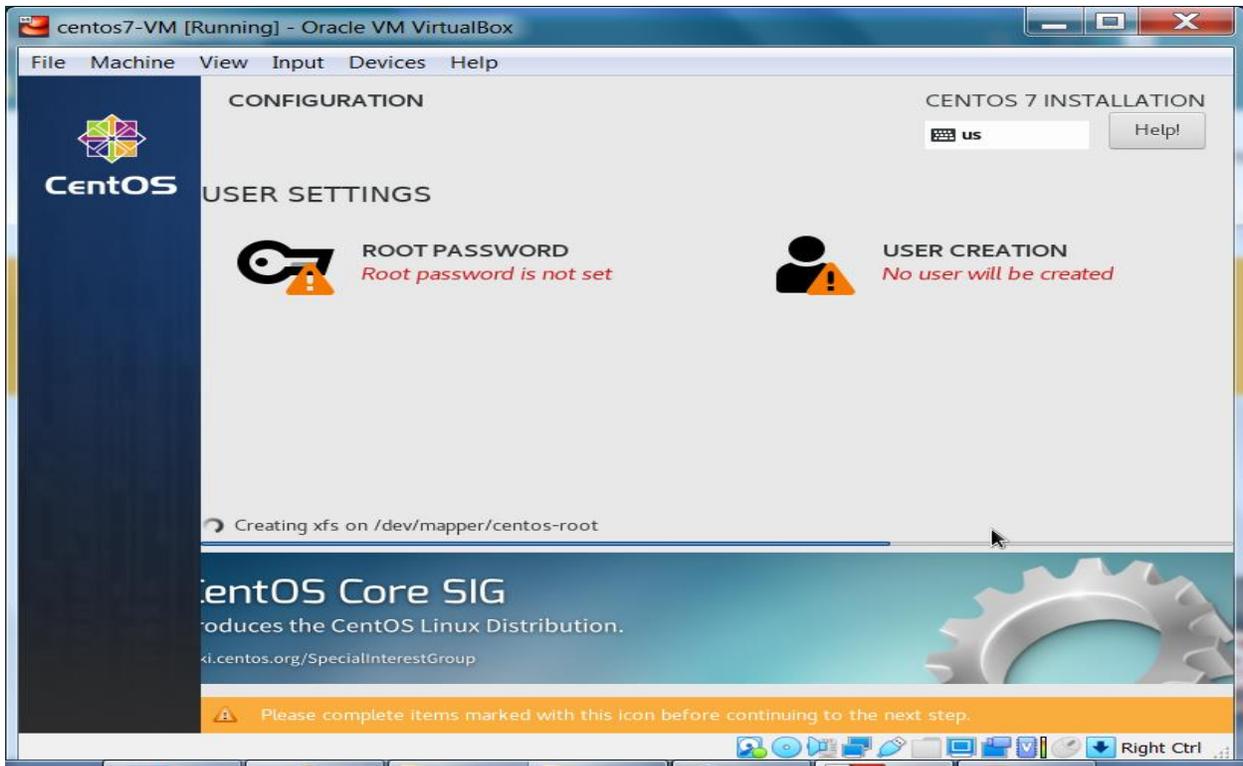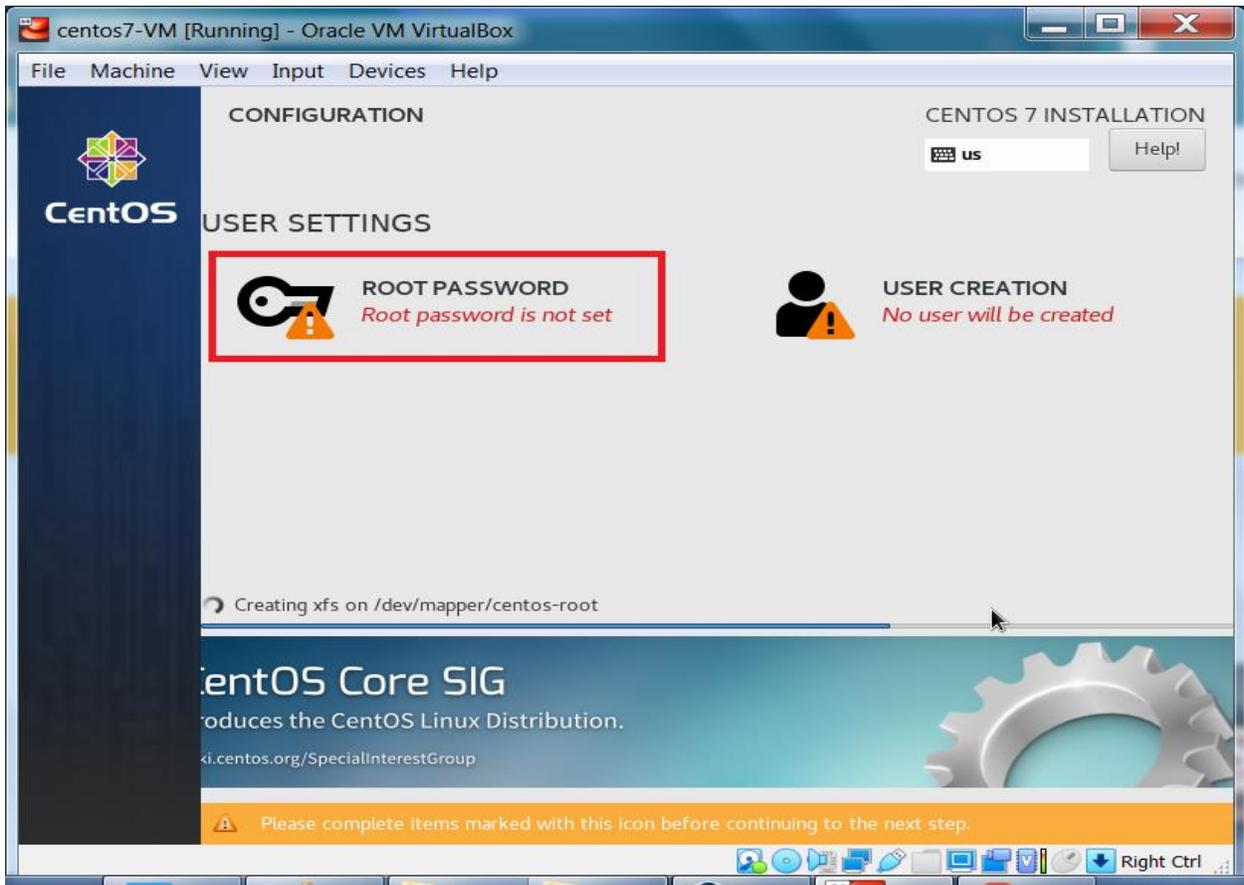

When you are done, click **Done**
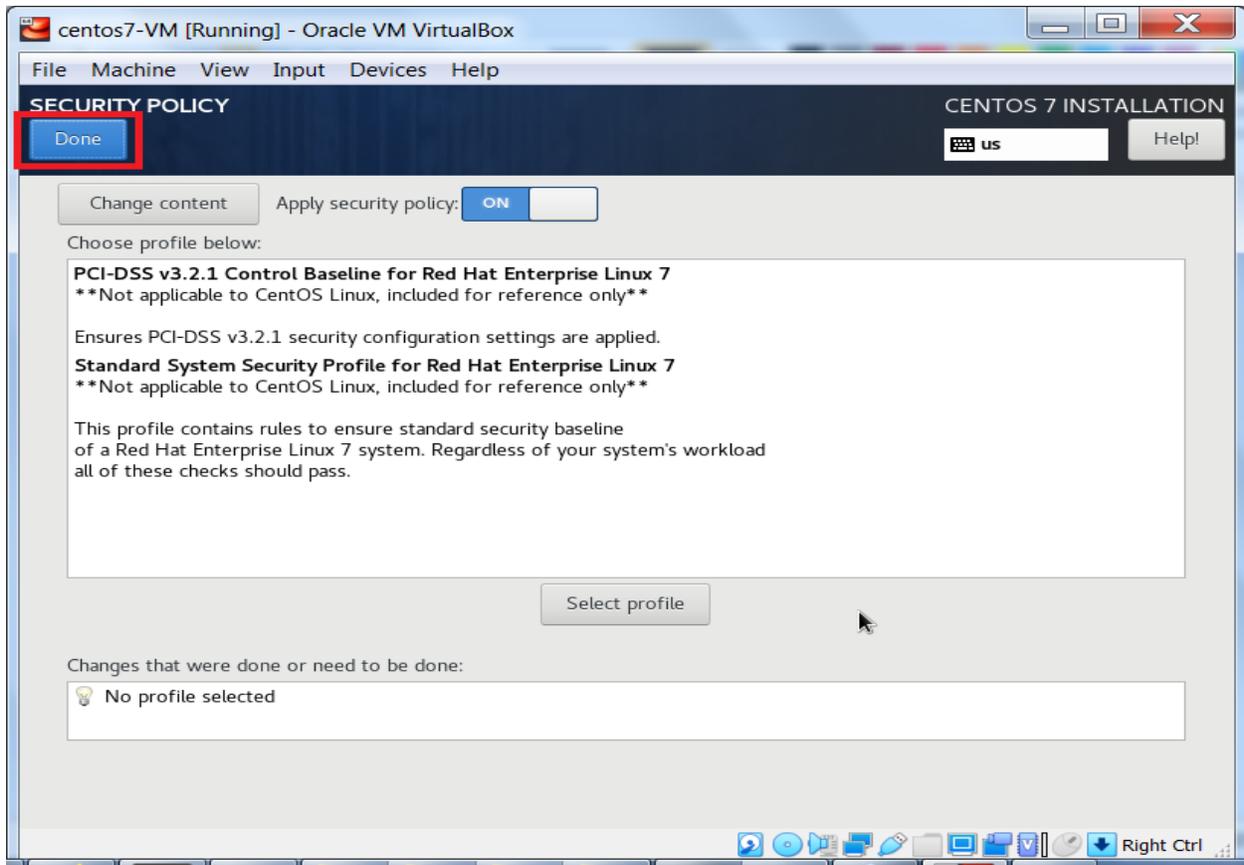
We are now ready to begin the installation of CentOS 7. Click "**Begin Installation**"
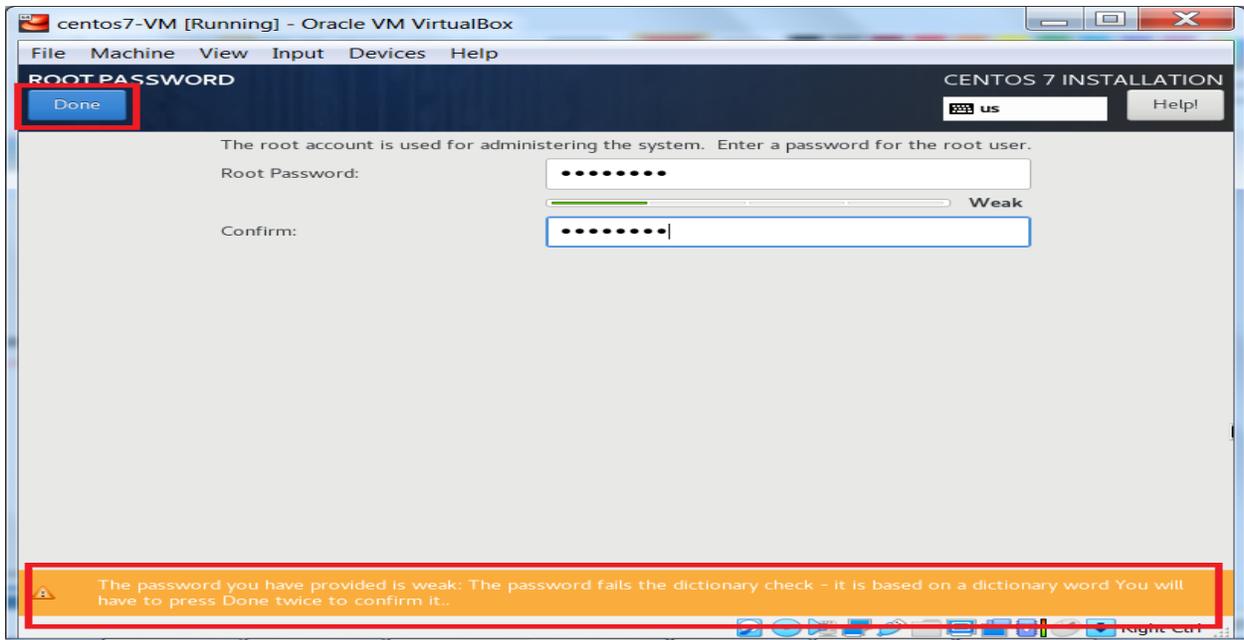

The installation has begun. We will need to set the root user's password, as well as, create a non-root user.
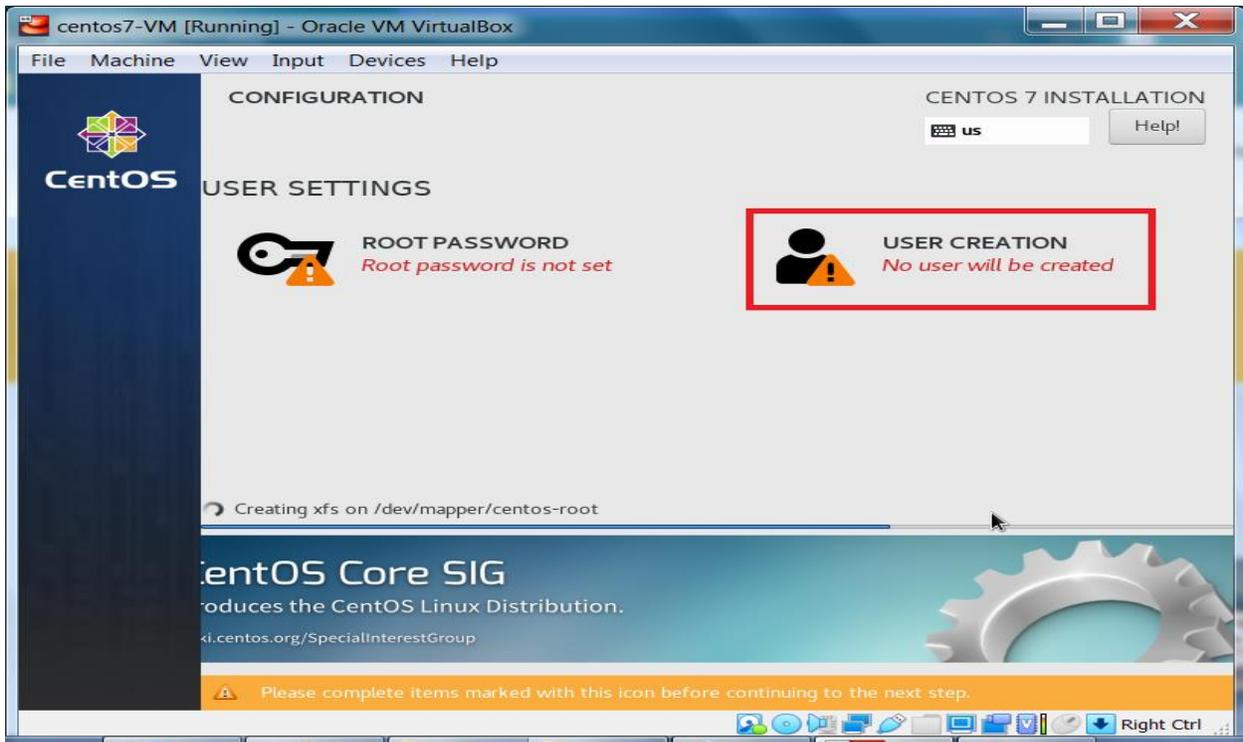
First, to set the root user's password, click **Root Password**

Enter the root user's password and click **Done**. Notice the warning message at the bottom of the screen. This is because I used a weak password. To bypass this warning, all we have to do is click **Done**, twice.

Now, to create a non-root user, click **User Creation**.

Enter the non-root user's details. Next, check the box to **Make this user an administrator** and click **Done**. Again, notice the warning message at the bottom of the screen. This is because I used a weak password. To bypass this warning, all we have to do is click **Done**, twice.
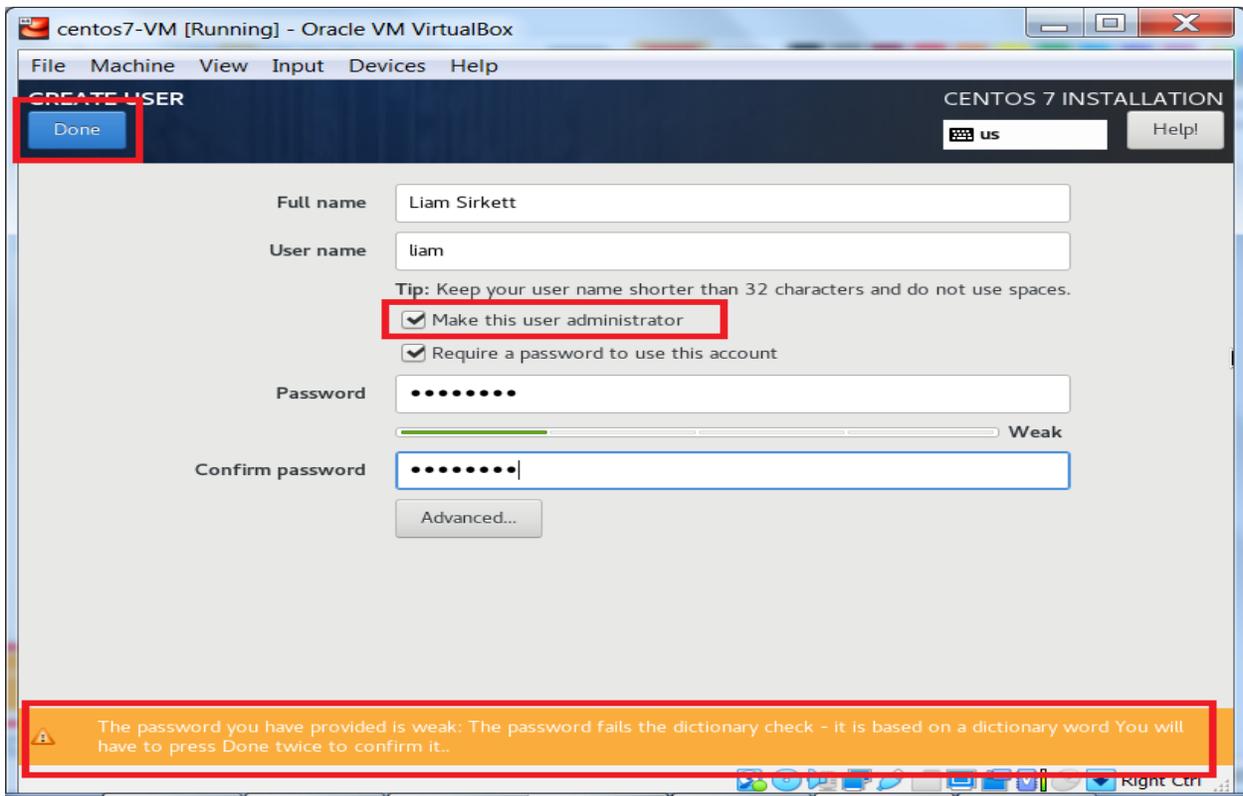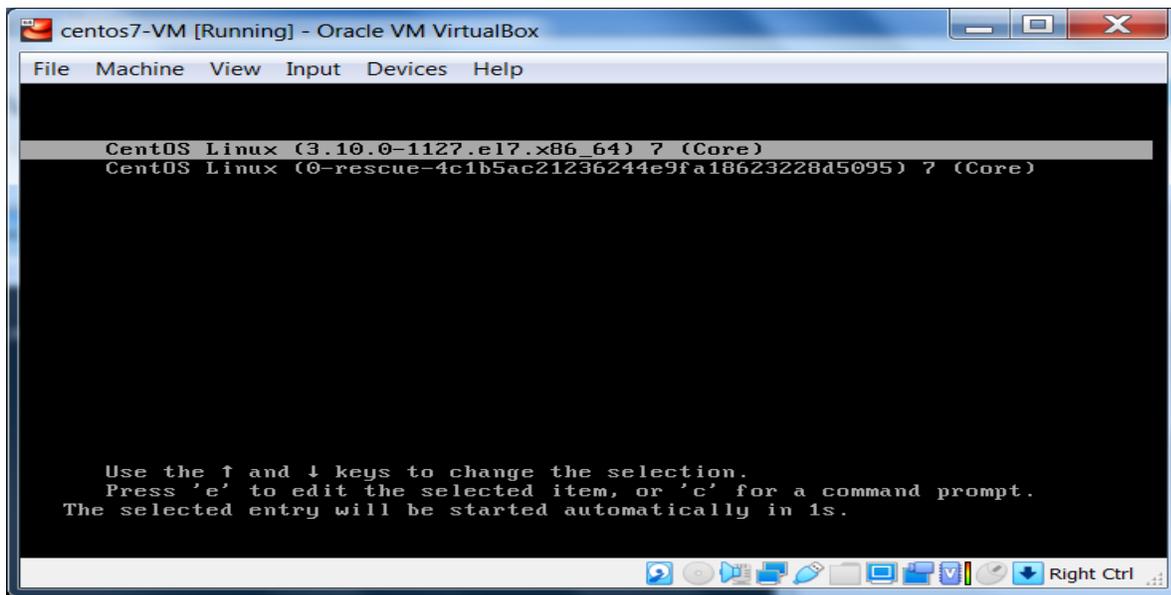
Since we are installing a minimal version of CentOS 7, the installation process will not take very long (15 – 20 min)
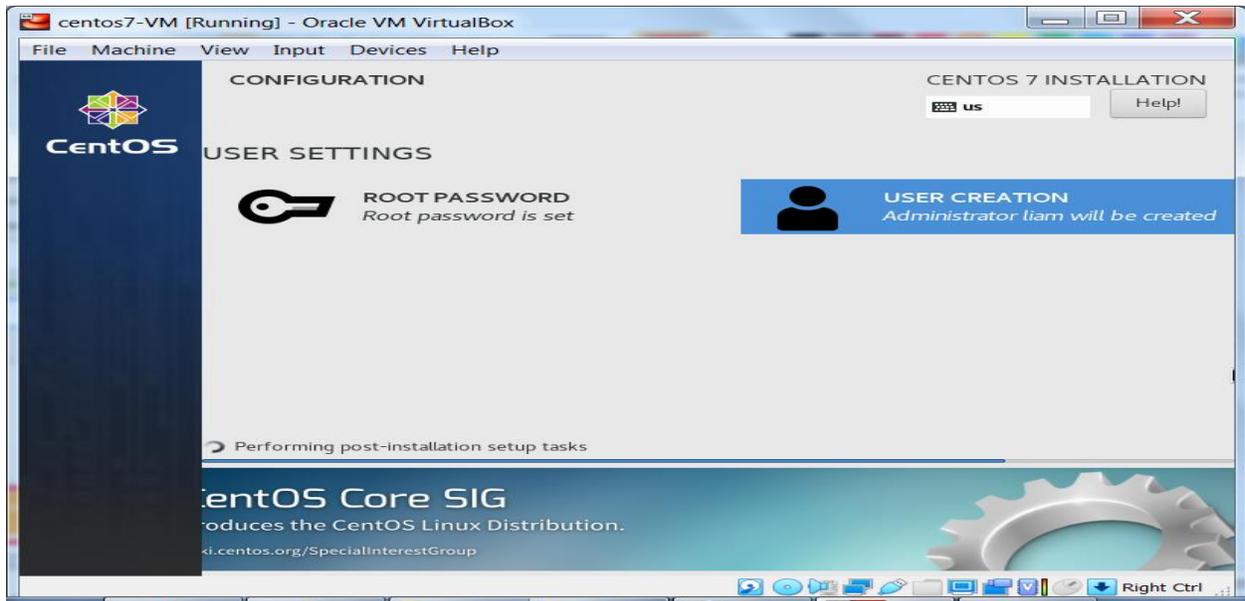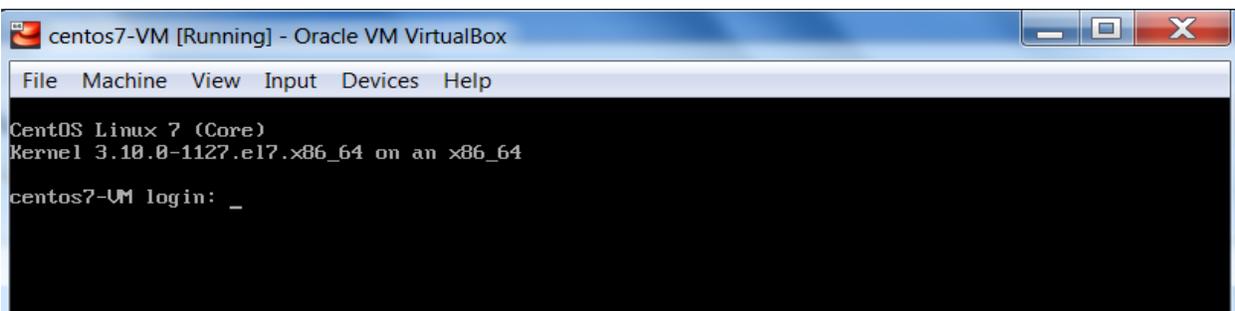

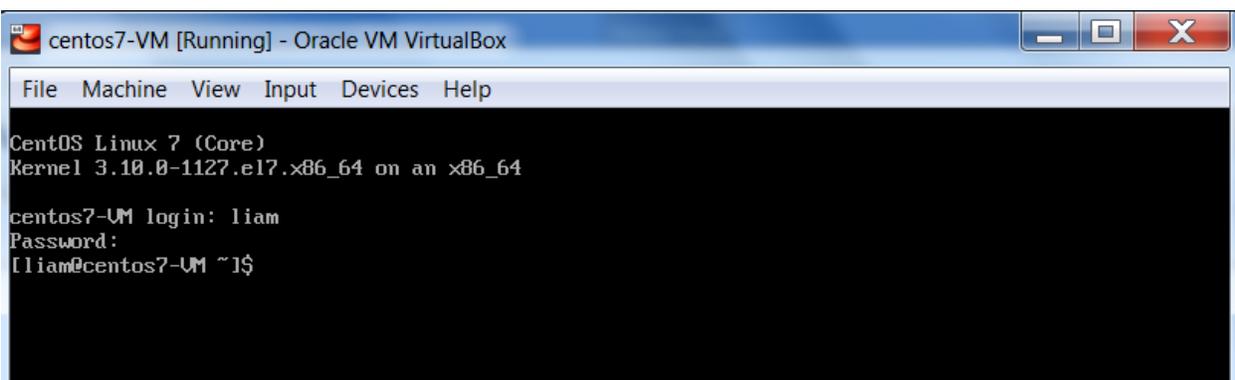Once the installation has completed, click **Reboot**
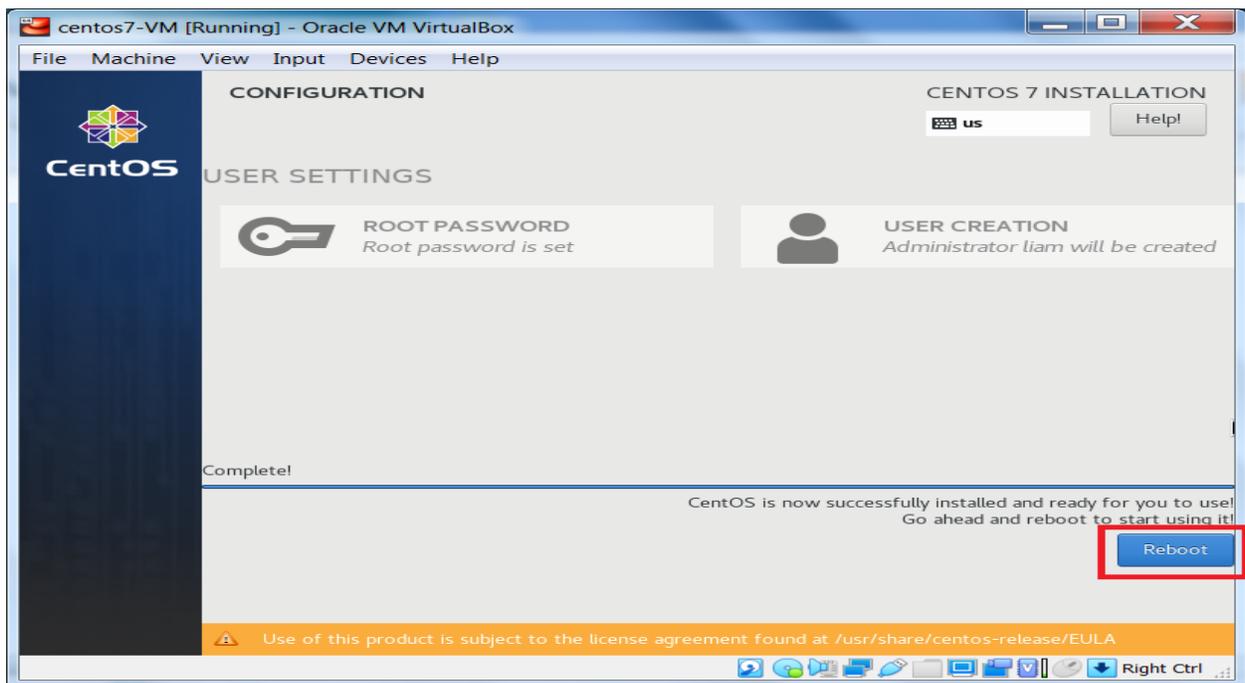
CentOS 7 is starting and we are seeing the kernel being used during the boot process.

Our CentOS 7 VM has rebooted successfully and we see the login screen.

At the login screen, enter the username, and password, of the non-root user you created during the installation.

We have logged in successfully. Now, we will shutdown the virtual machine.

To do this, the non-root user (in my case, **liam**) must have **sudo** ("**superuser do**") privileges. Since we set this non-root user to be an administrator, this non-root user has **sudo** privileges and can execute the following command:

```
sudo shutdown -h now
```
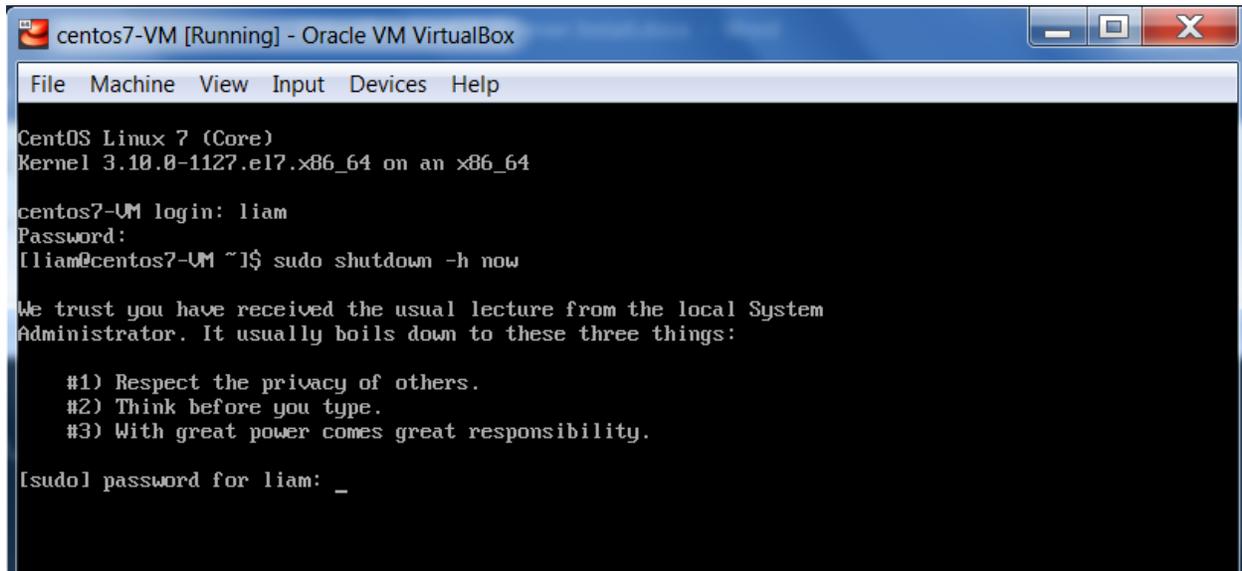

We are prompted for the non-root user's password to confirm that we want to execute this command. What we are doing is executing a command with the privileges of the **root** user.

Again, this is the reason we set our non-root user to be an administrator, so that the user has **sudo** privileges and can execute commands normally only executable by the **root** user.

To reiterate, the command, **sudo** ("**superuser do**"), is allowing your logged in user, who is a non-root user, to execute the command, **shutdown**, which can only be executed with the privileges of the **root** user.

Finally, after executing the command, the VM (virtual machine) will shutdown and we can return to the VirtualBox Manager interface.
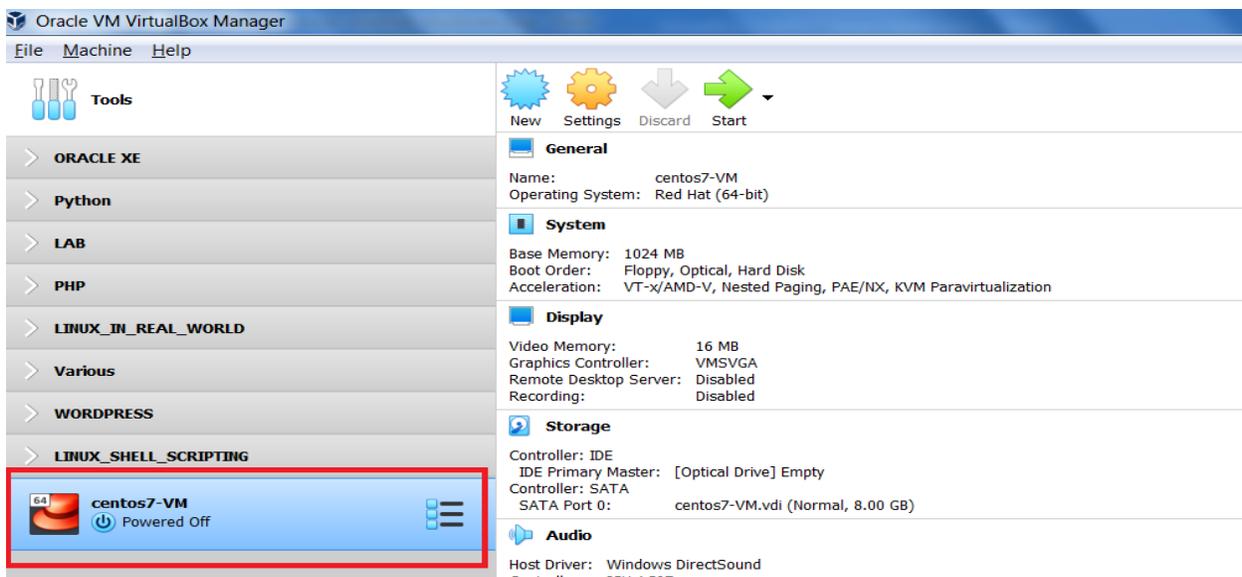

We have successfully installed a minimal version of **CentOS 7** in a **VirtualBox 6.1.2** virtual machine.
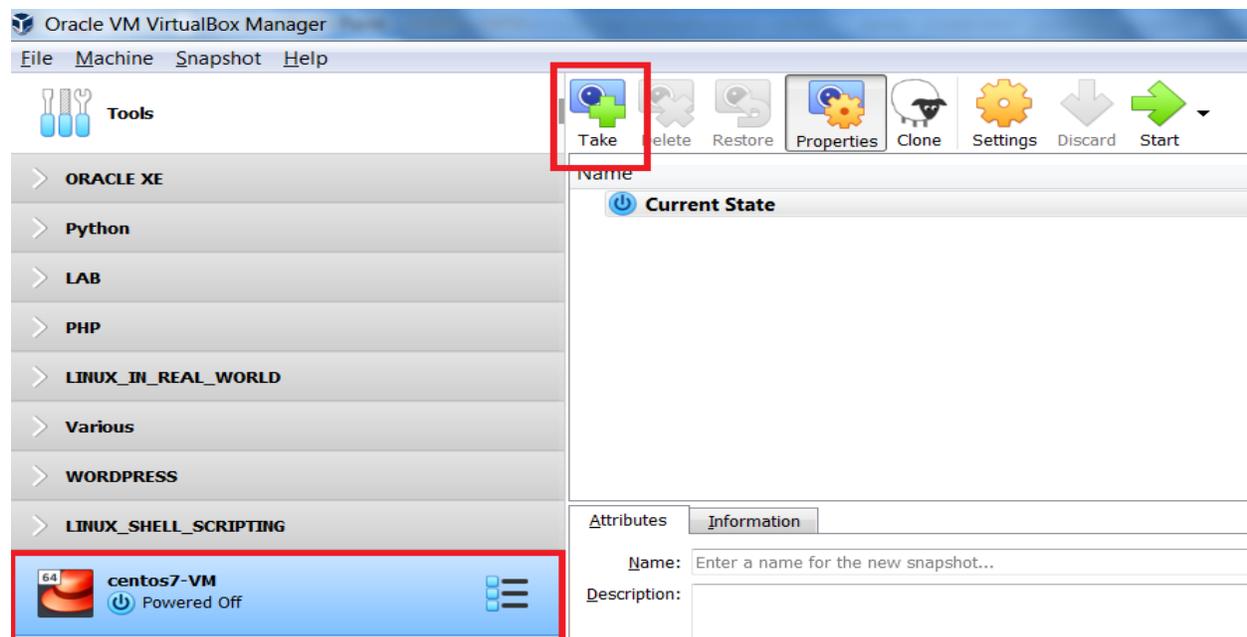
Take Snapshot

To be on the safe side. After I have successfully completed a task, such as installing or updating a VM, I like taking a snapshot to preserve the virtual machine's state. That way I ensure, in the future, if the VM stops responding, or behaving as it should, I can always revert back to that snapshot.

In the VirtualBox Manager interface, we are currently in **Details** view. To switch to **Snapshots** view, click the list icon next to the virtual machine name, and select **Snapshots**.
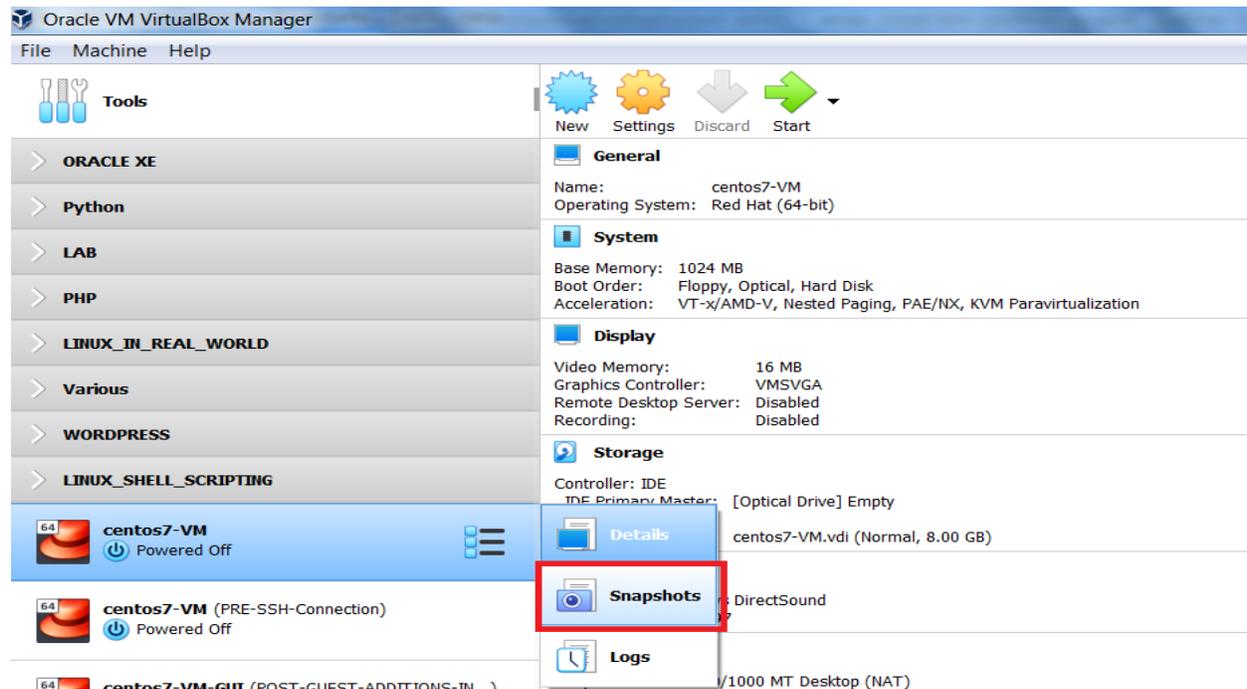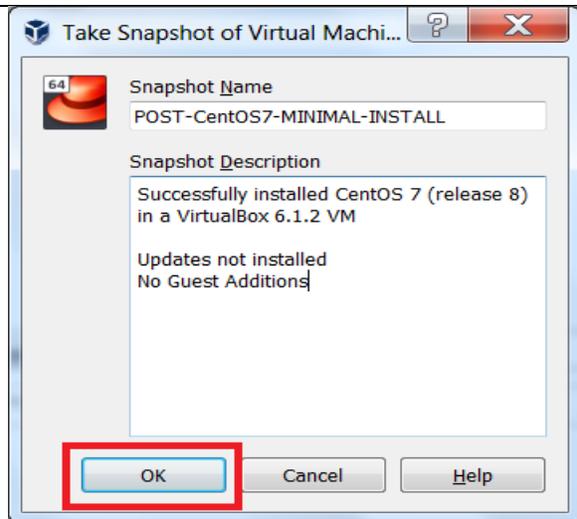

To take a snapshot, on the VirtualBox Manager Interface, ensure your VM is selected and click **Take**
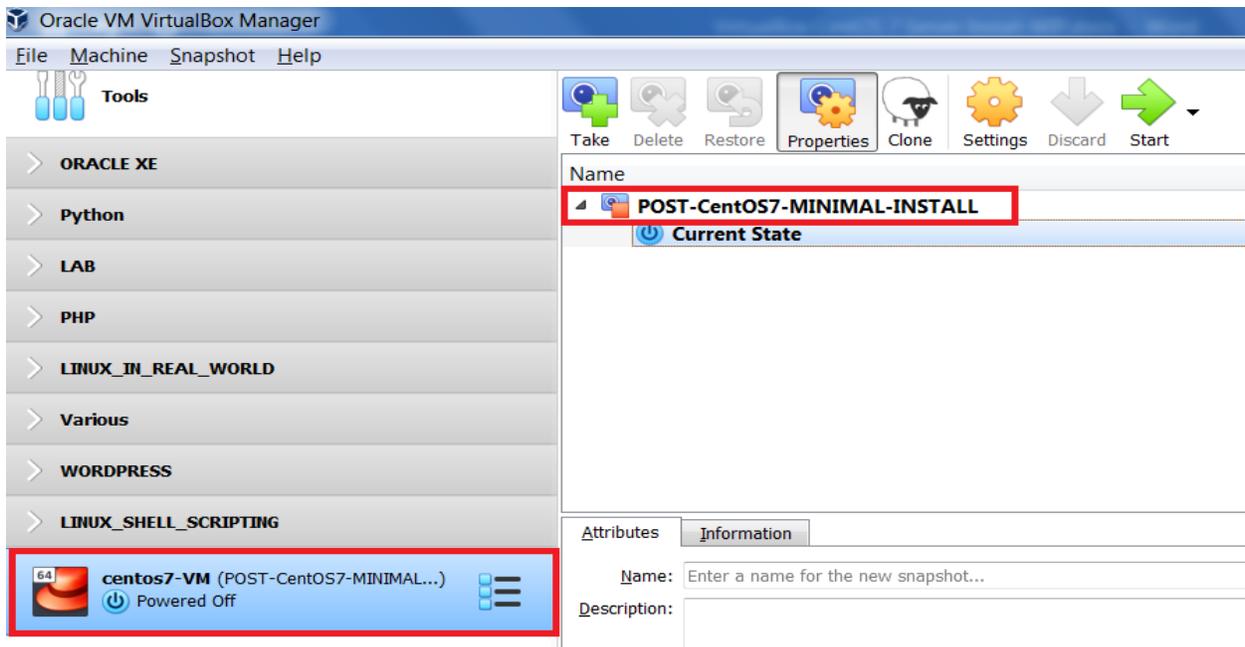
Enter a name for the snapshot, as well as, a short description, then, click **OK**

I've taken a snapshot "**POST-CentOS7-MINIMAL-INSTALL**" to ensure that I have a starting point to revert back to, if needed.

We have successfully taken a snapshot and ensure that we can always revert back to a working virtual machine with a minimal version of **CentOS 7** installed.

Hopefully, you've enjoyed completing this tutorial and found it helpful.

After completing this tutorial, if you decide that you would like, or need, a desktop environment, you should consider the **MATE Desktop**. It uses minimal system resources.

I have another tutorial that demonstrates the installation of the **MATE Desktop** on a **CentOS 7 minimal install VM**. It can be accessed **here**.

My main tutorials page can be accessed **here**, while my VirtualBox specific tutorials can be accessed **here**.