

Red Hat 8.6 Linux Setup Guide

For ThinkStation P360 Tower, Tiny, Ultra



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Section 1 – BIOS Configuration

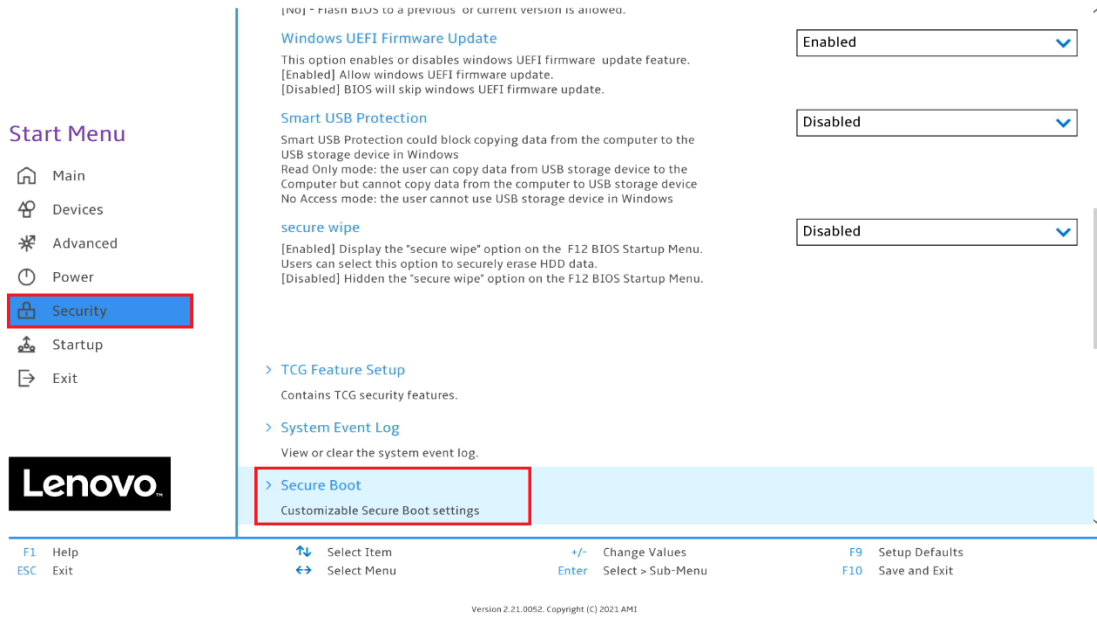
The first step before installing Linux is to make sure the system BIOS is setup correctly.

- Boot into BIOS by pressing the function F1 key at the “Lenovo” splash screen.

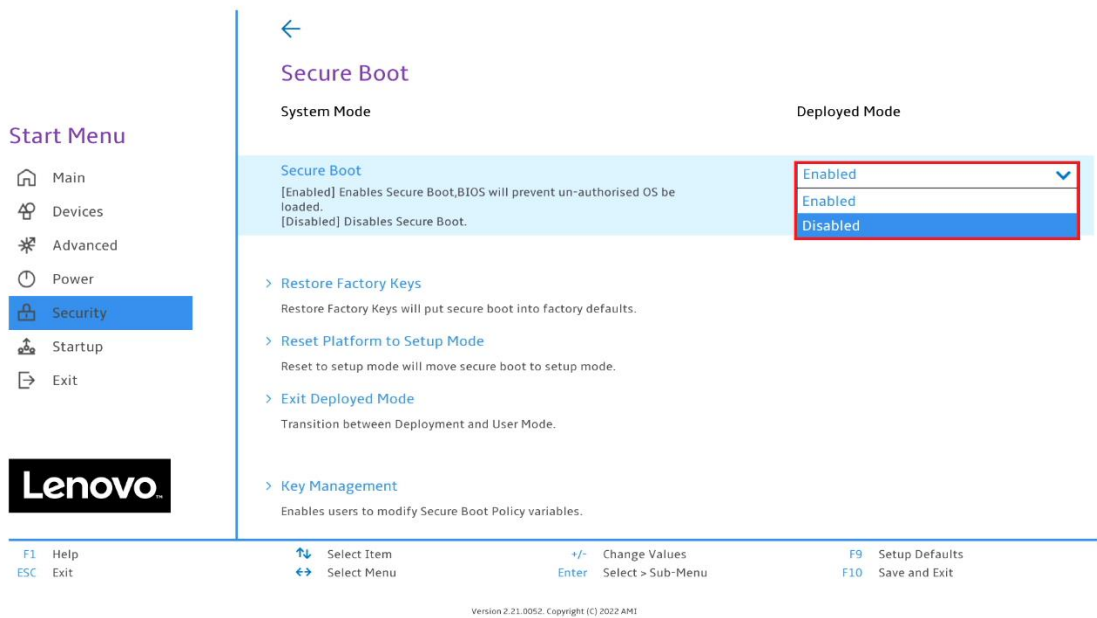
A black rectangular splash screen with the word "Lenovo" in white, sans-serif font centered in the middle. The "Lenovo" text includes a small trademark symbol (TM) at the end.

Lenovo™

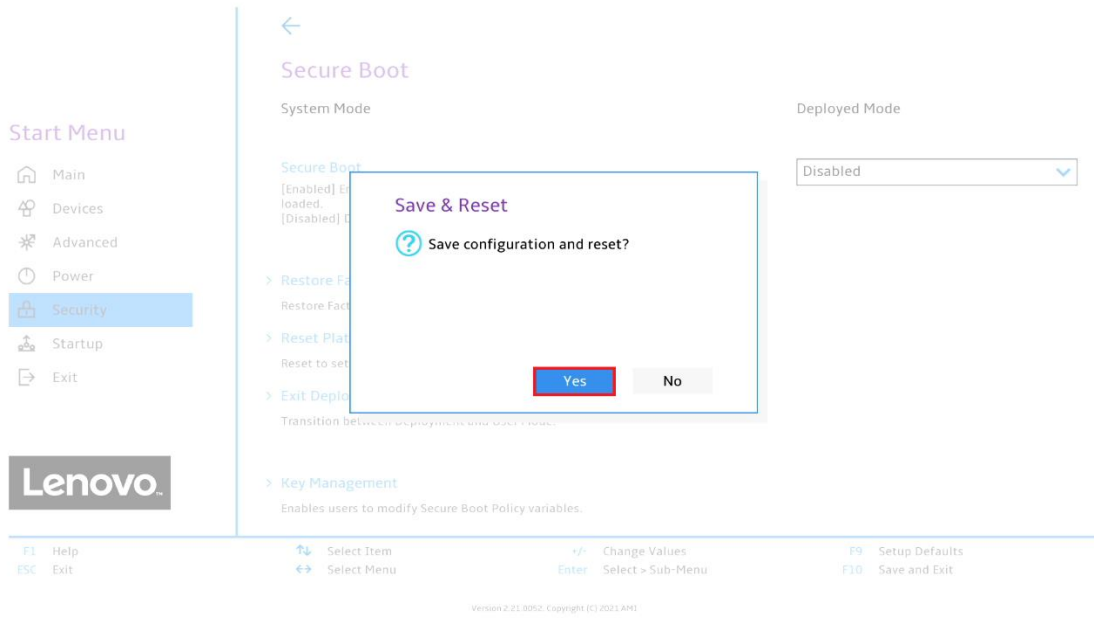
- Tab over to the Security tab and select “Secure Boot”.



- Check whether Secure Boot is disabled. If found enabled, disable it.



- Save changes by pressing F10 function key.



Section 2 – Installing RHEL 8.6

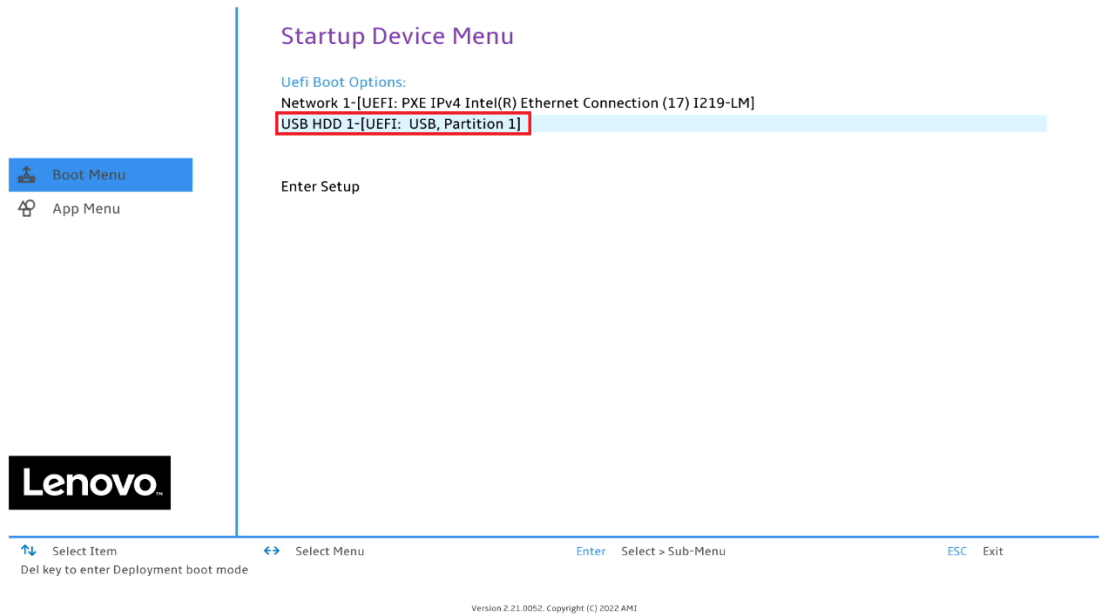
Please refer to the following instructions and screenshots on how to install RHEL on the Lenovo ThinkStation P360.

- Insert the RHEL installation media (either through USB or CD/DVD)
- Power on the system and press the F12 function key whenever the following Lenovo splash screen appears.

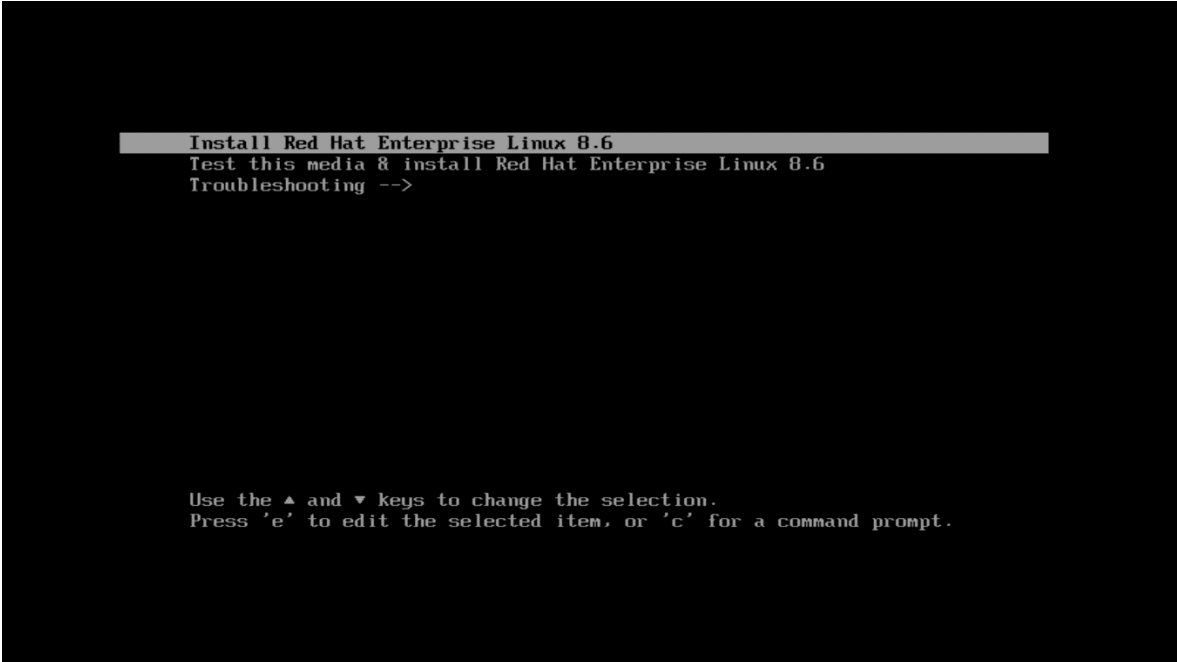
A black rectangular splash screen with the word "Lenovo" in white, sans-serif font centered in the middle. The text is slightly larger than the standard logo and includes a small trademark symbol (TM) at the end.

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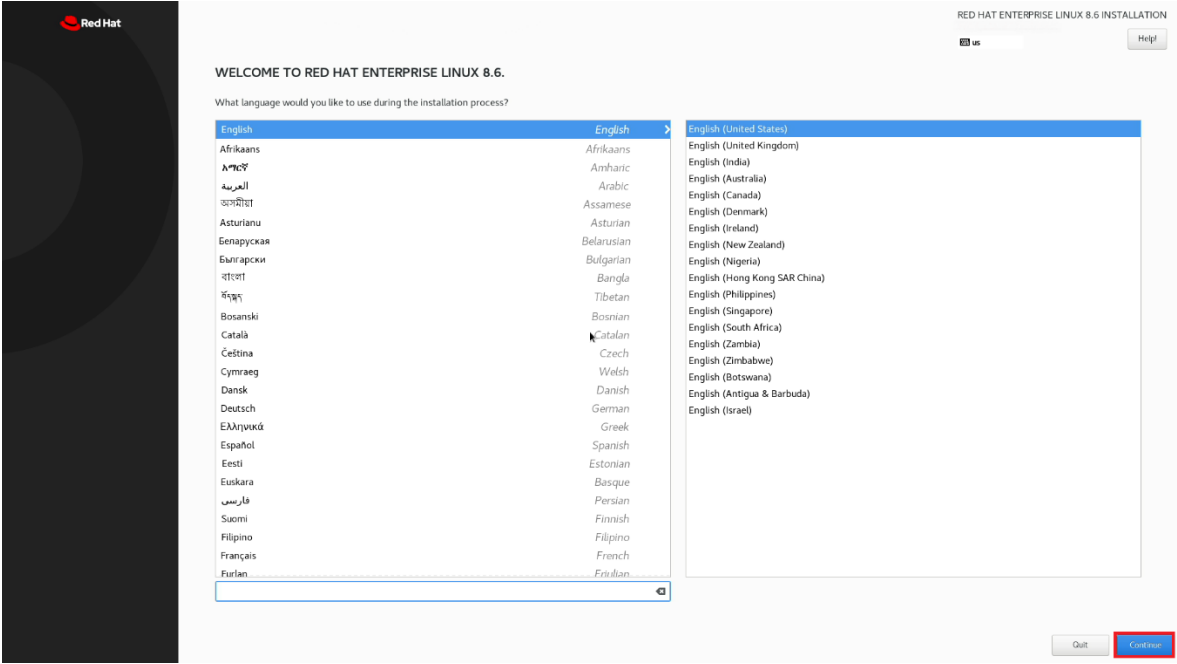
- Select the Linux bootable installation media from the F12 boot menu list.



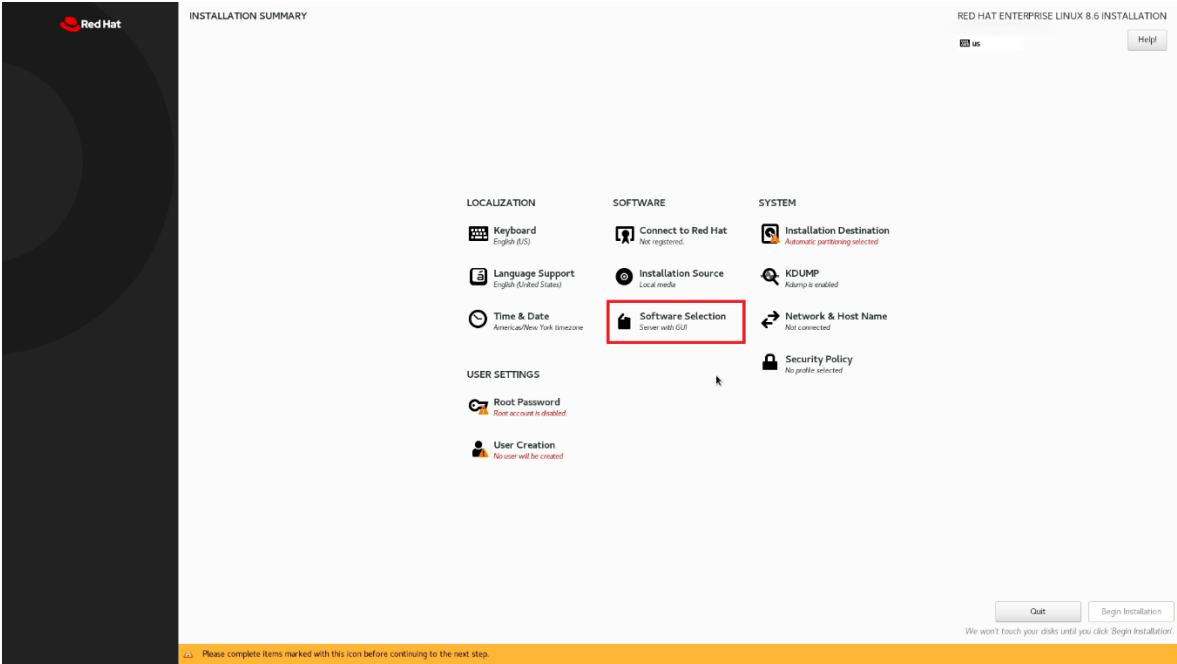
- Select “Install Red Hat Enterprise 8.6” from the GRUB boot menu



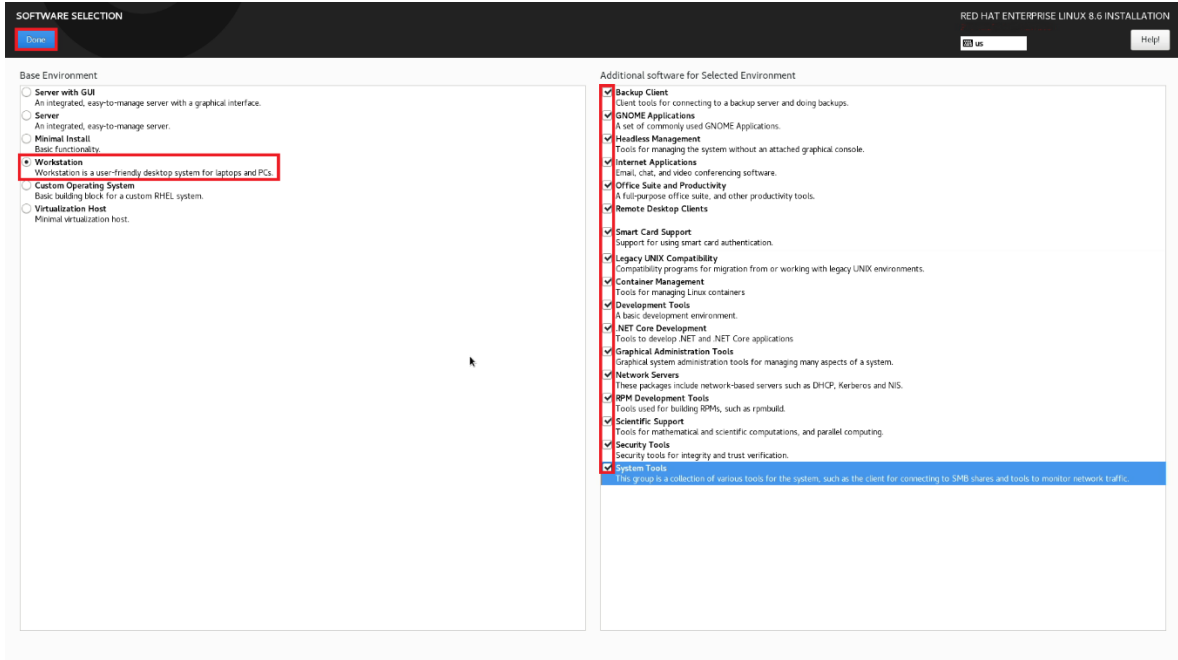
- The Red hat Enterprise Linux Welcome Screen should appear. Select the appropriate language and “Continue”.



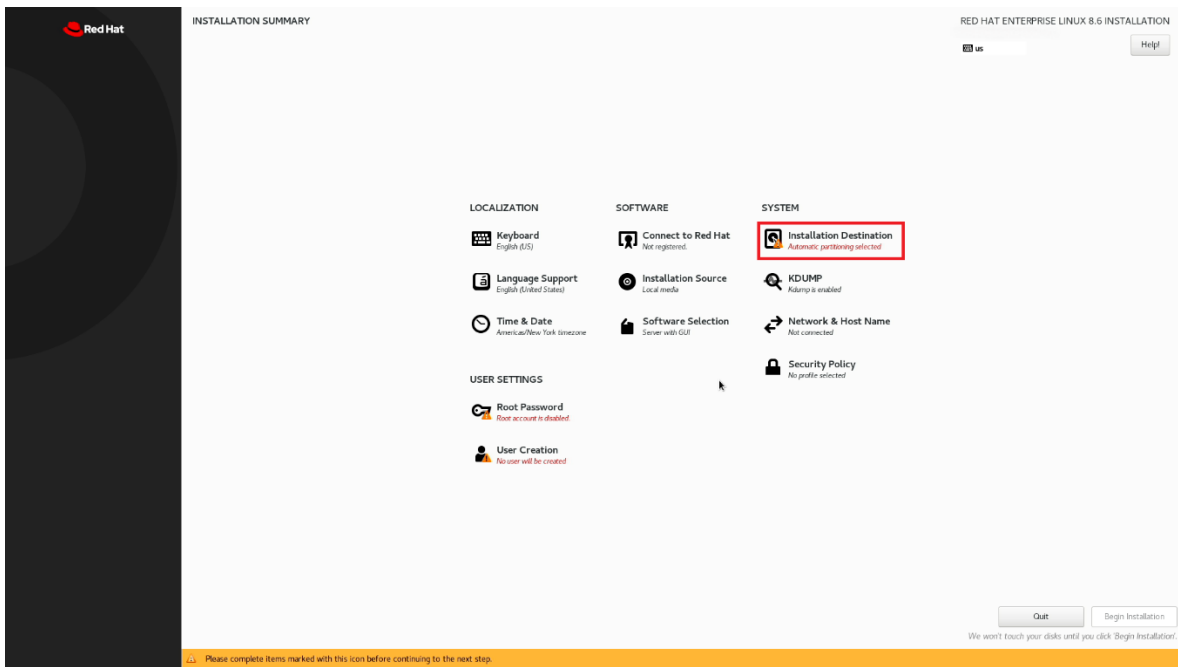
- Select “SOFTWARE SELECTION” and choose the type of software to install.



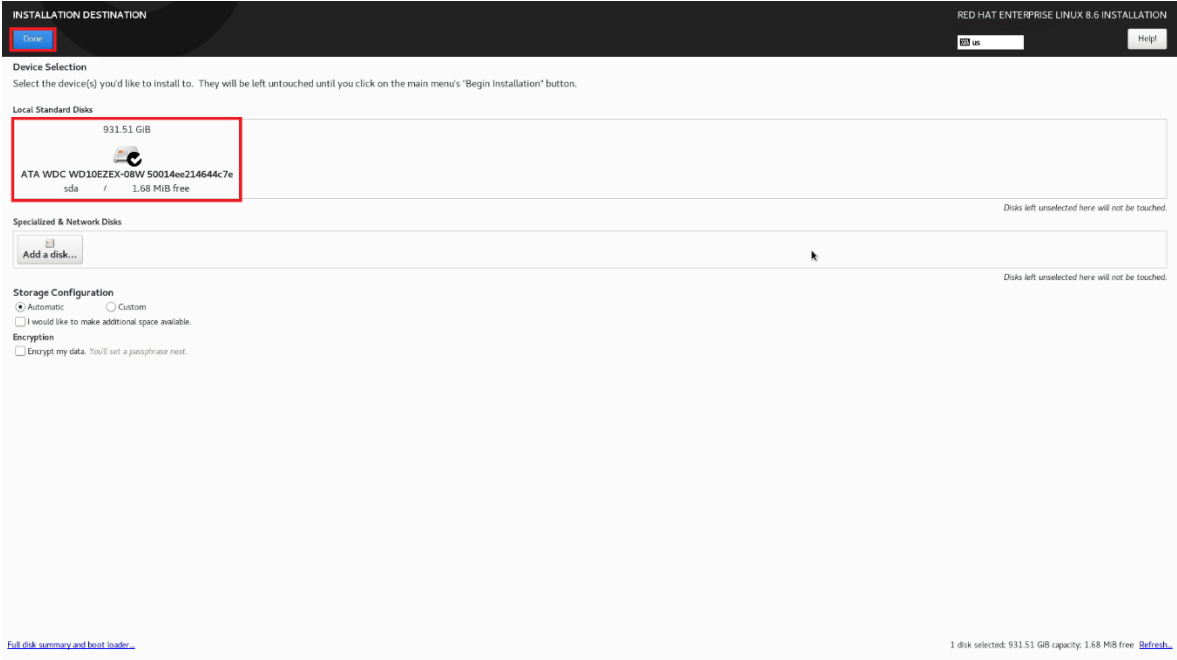
- Select the type of “Base Environment” as well as each “Add-Ons” to install. In this example, “Workstation” was selected for the “Base Environment” and all “Add-Ons” were selected.



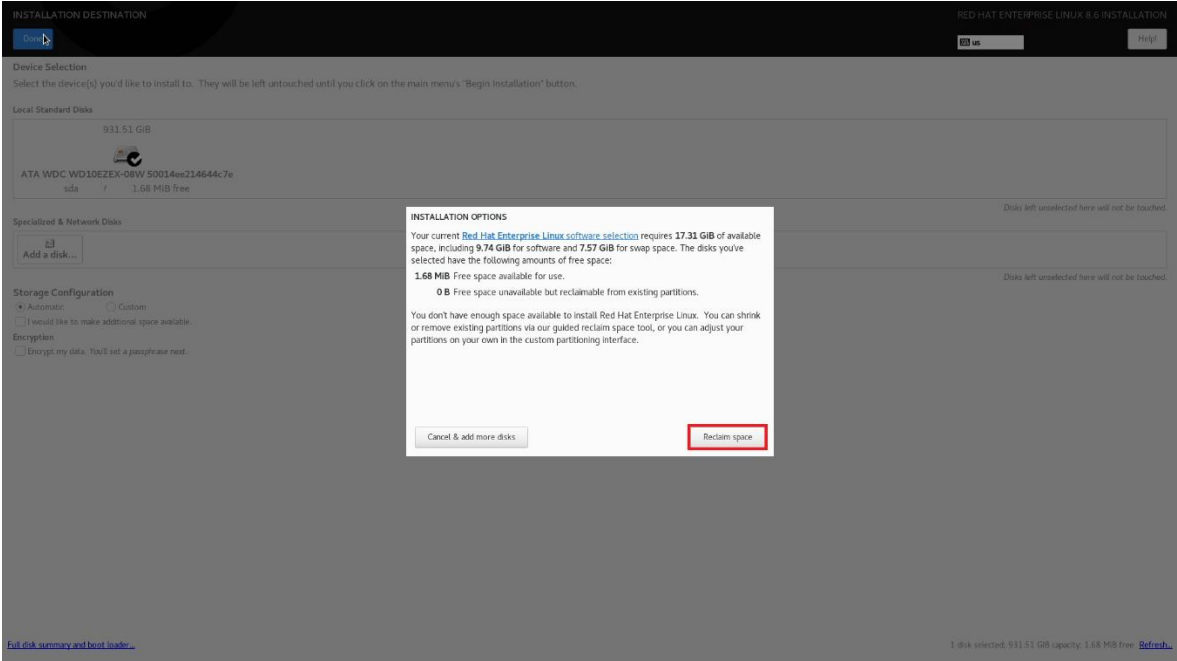
- Select “Installation Destination”.



- Select the device on where to install the operating system and “Done” in the upper left.



- For storage devices with previous partitions created. Select “Reclaim space”.



- Select “Delete all” to delete all the previously created partitions or select each partition to delete and select the “Delete” option. When done, select “Reclaim space” at the bottom.

RECLAIM DISK SPACE

You can remove existing file systems you no longer need to free up space for this installation. Removing a file system will permanently delete all of the data it contains.

There is also free space available in pre-existing file systems. While it's risky and we recommend you back up your data first, you can recover that free disk space and make it available for this installation below.

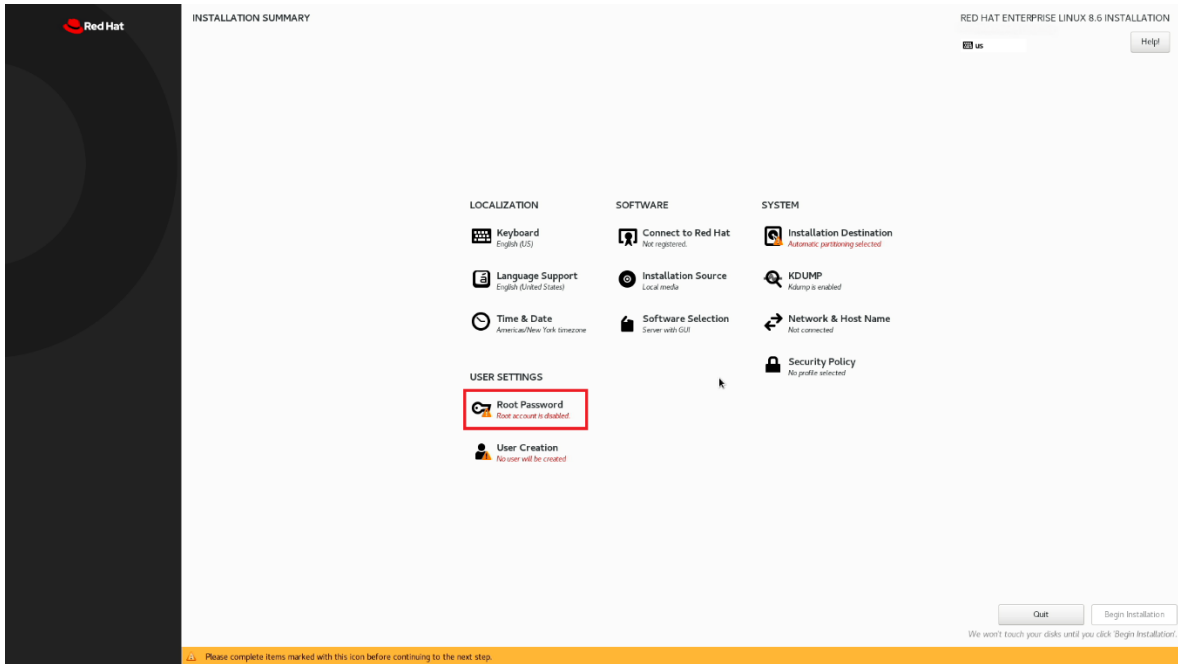
Disk	Name	File System	Reclaimable Space	Action
931.5 GB ATA WDC WD10EZEX-08W 50014ee21464	sda		931.5 GB	Preserve
— /boot/efi (Red Hat Enterprise Linux 8.6 for x86_64)	sda1	EFI System Partition	Not reclaimable	Preserve
— /boot (Red Hat Enterprise Linux 8.6 for x86_64)	sda2	xfs	0 B of 1024 MB	Preserve
— rhel	sda3	physical volume (LVM)	Not reclaimable	Preserve
— Free space			1.7 MB	

1 disk, 930.51 GB reclaimable space (in file systems)

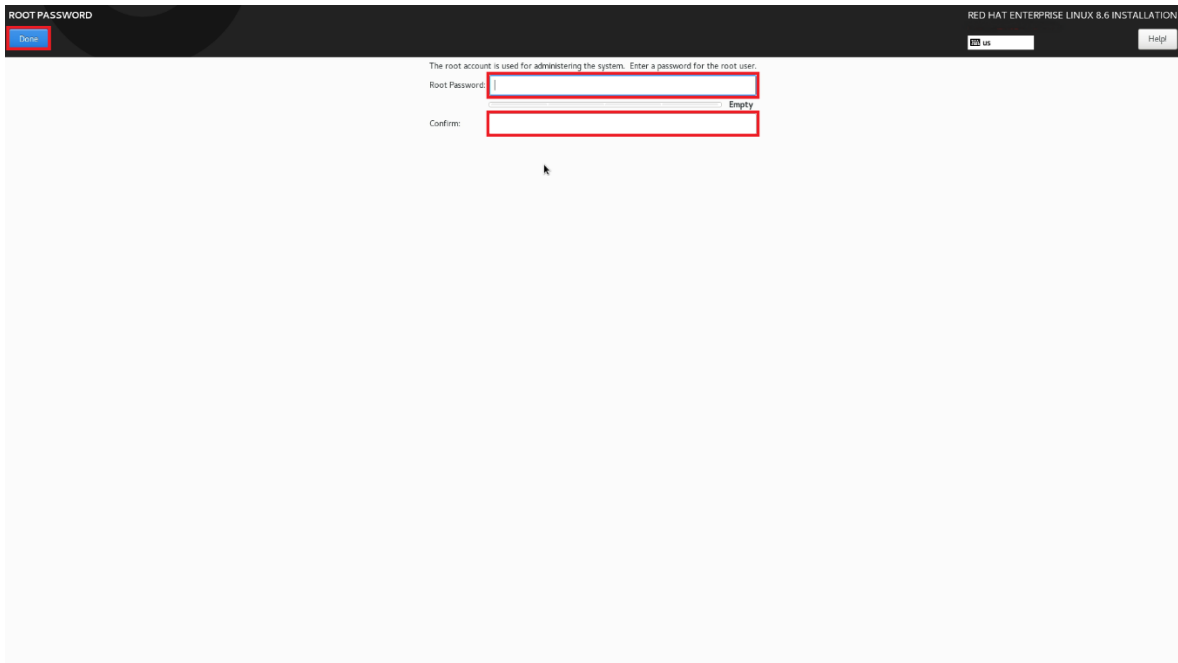
Total selected space to reclaim: 0
Installation requires a total of 12.17 GB for system data.

Buttons: **Delete all**, **Reclaim space**

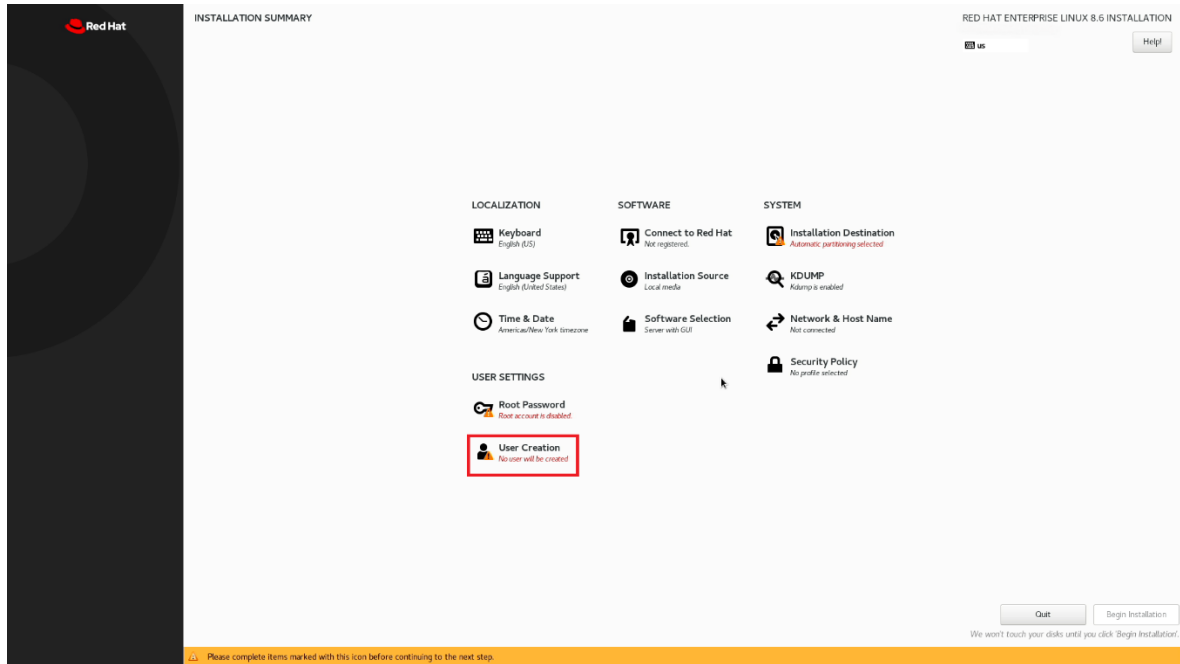
- Select “Root Password”.



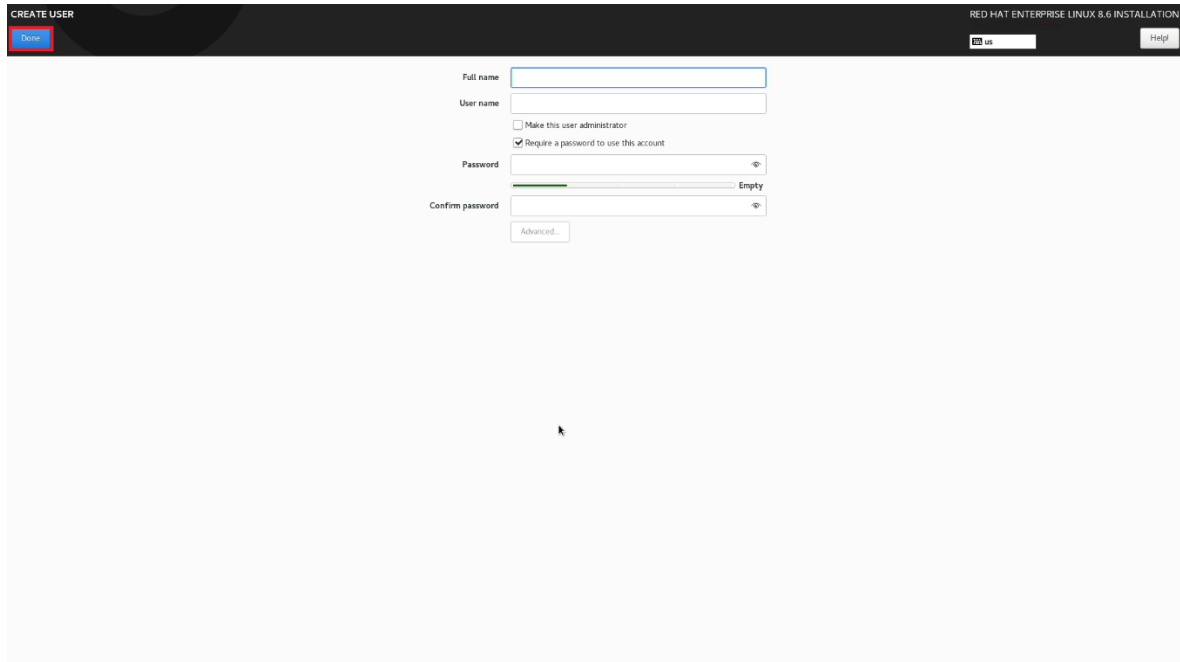
- Enter a root password in both of boxes below and select “Done” in the upper left.



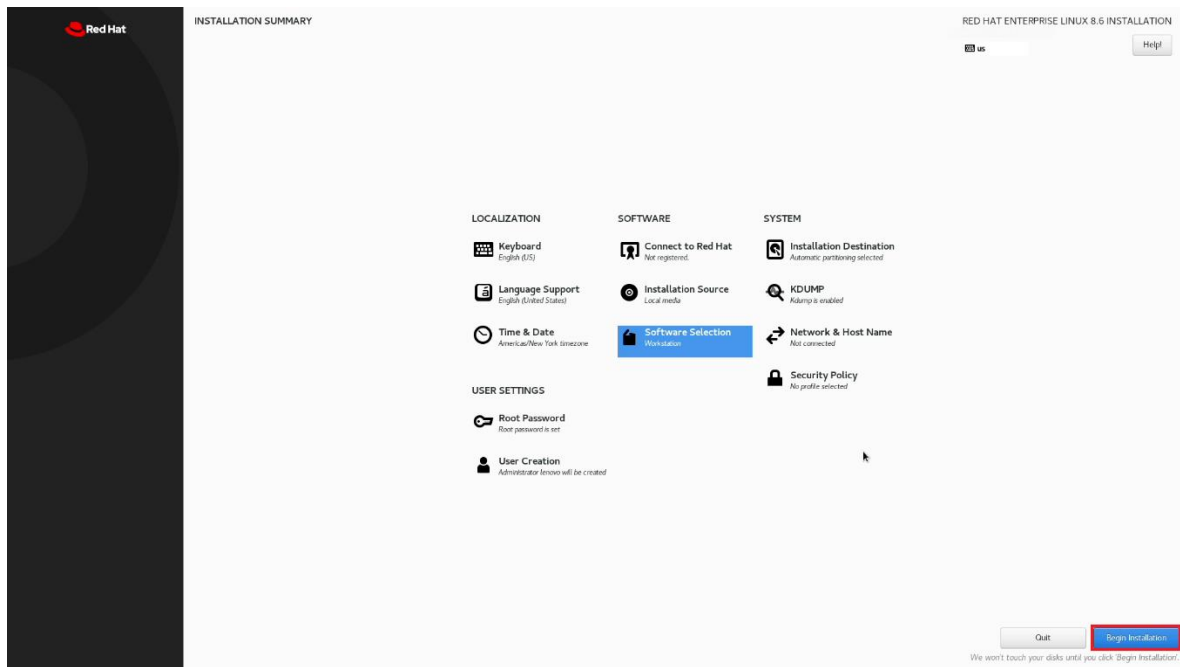
- Select “User Creation”.



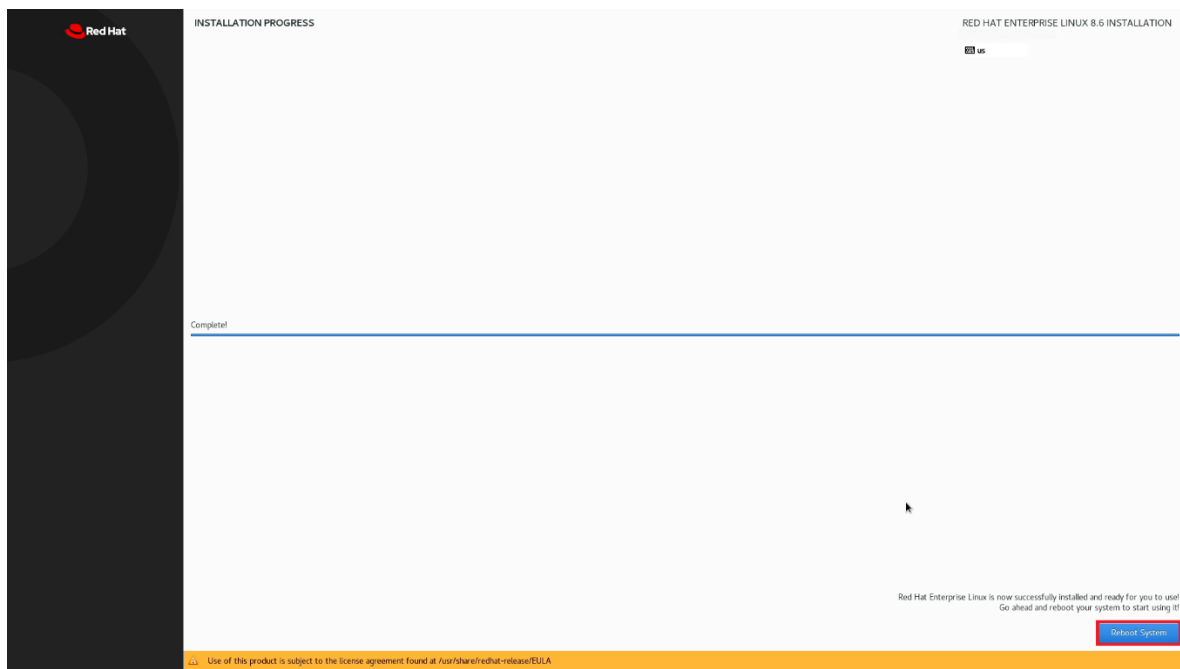
- Fill in the appropriate boxes below and select “Done” in the upper left.



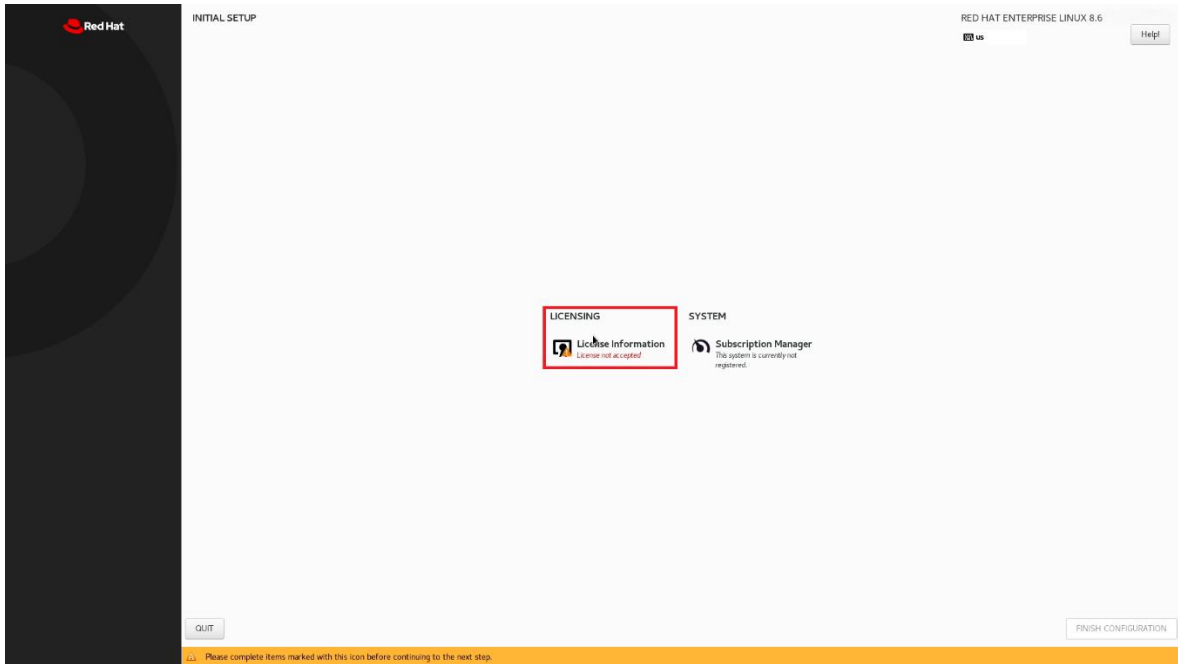
- Select “Begin Installation” in the bottom right.



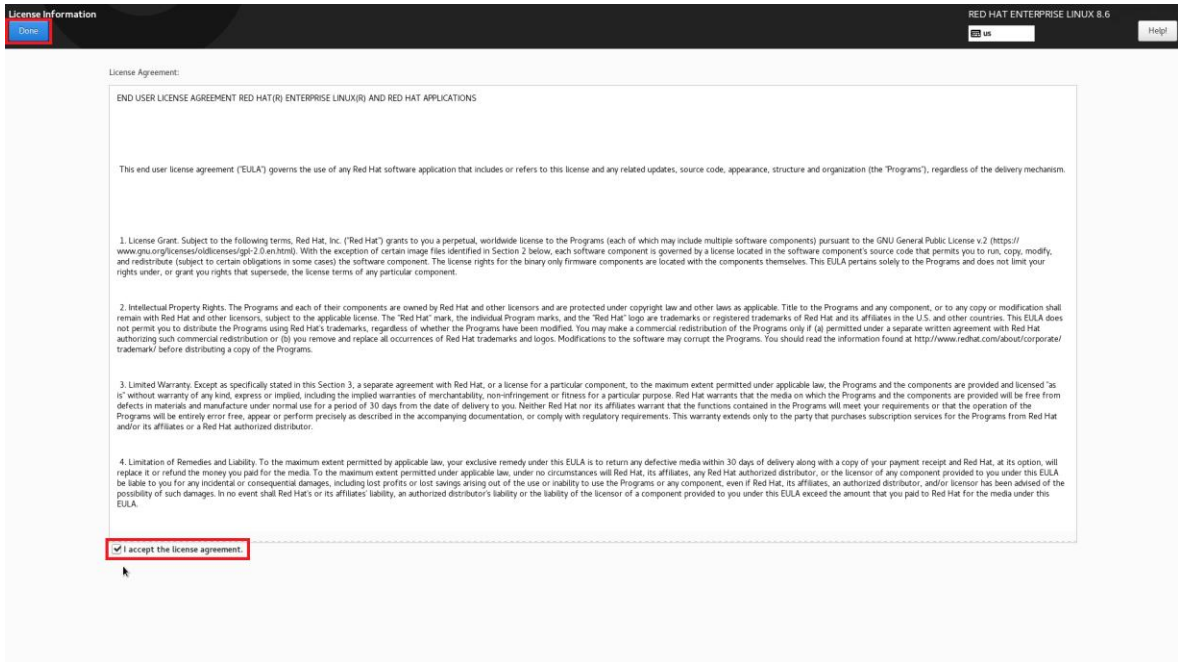
- Once the installation completes, select “Reboot” at the bottom right.



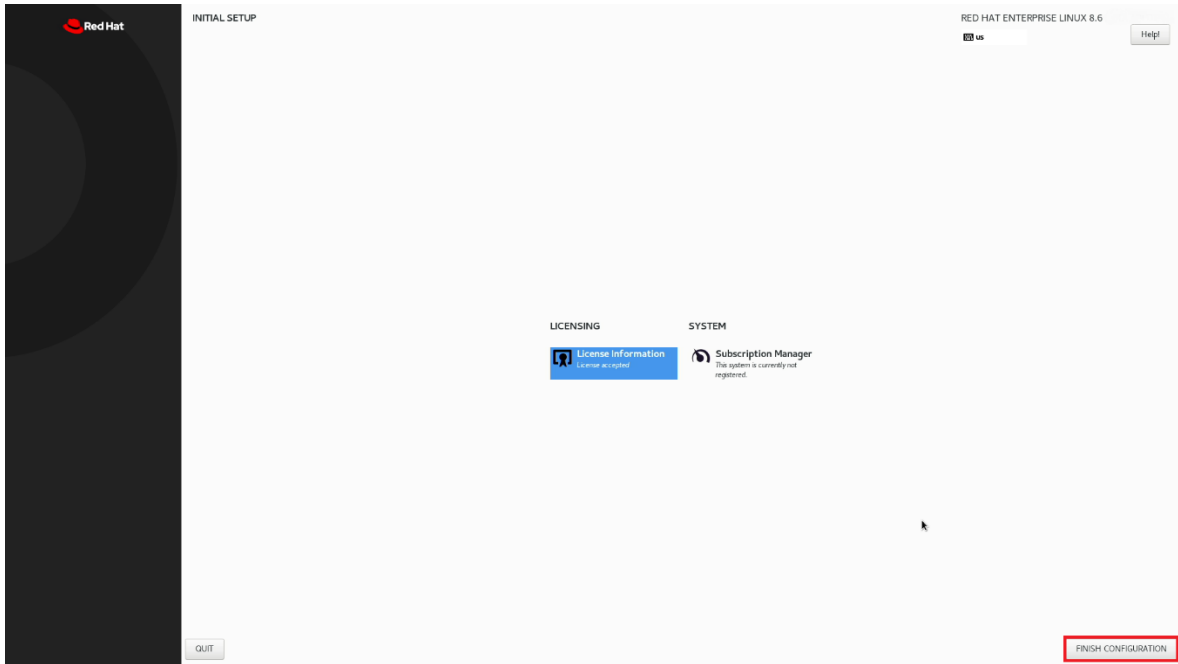
- Select “License Information”.



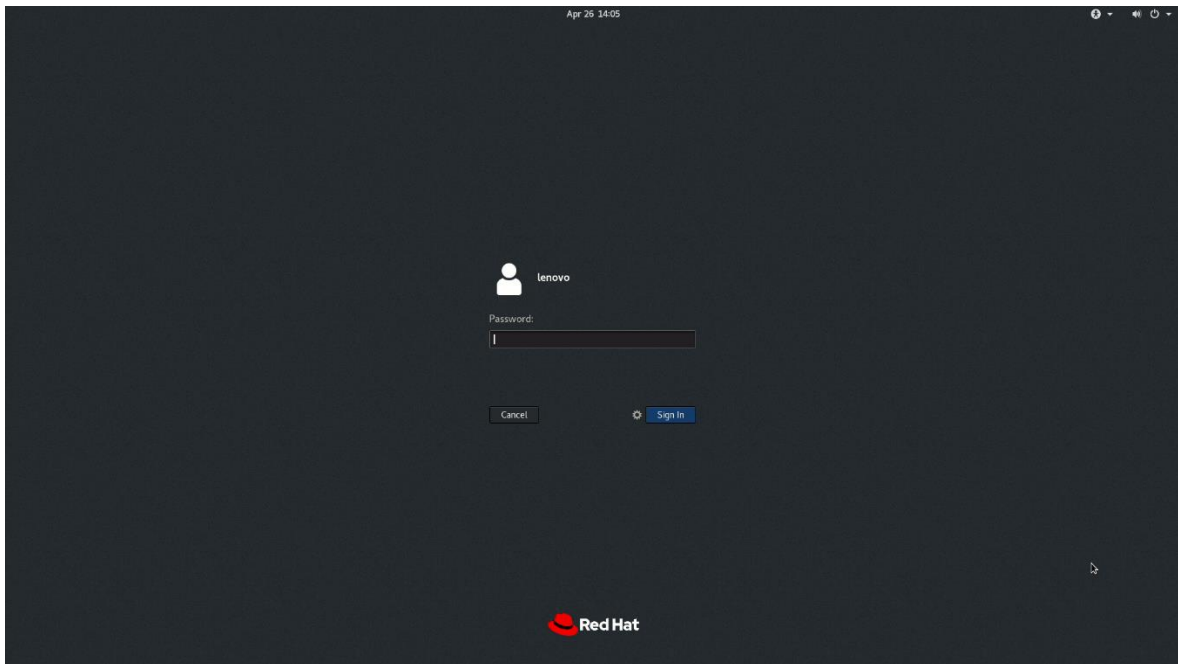
- Check the box at the bottom left and “Done” at the upper left.



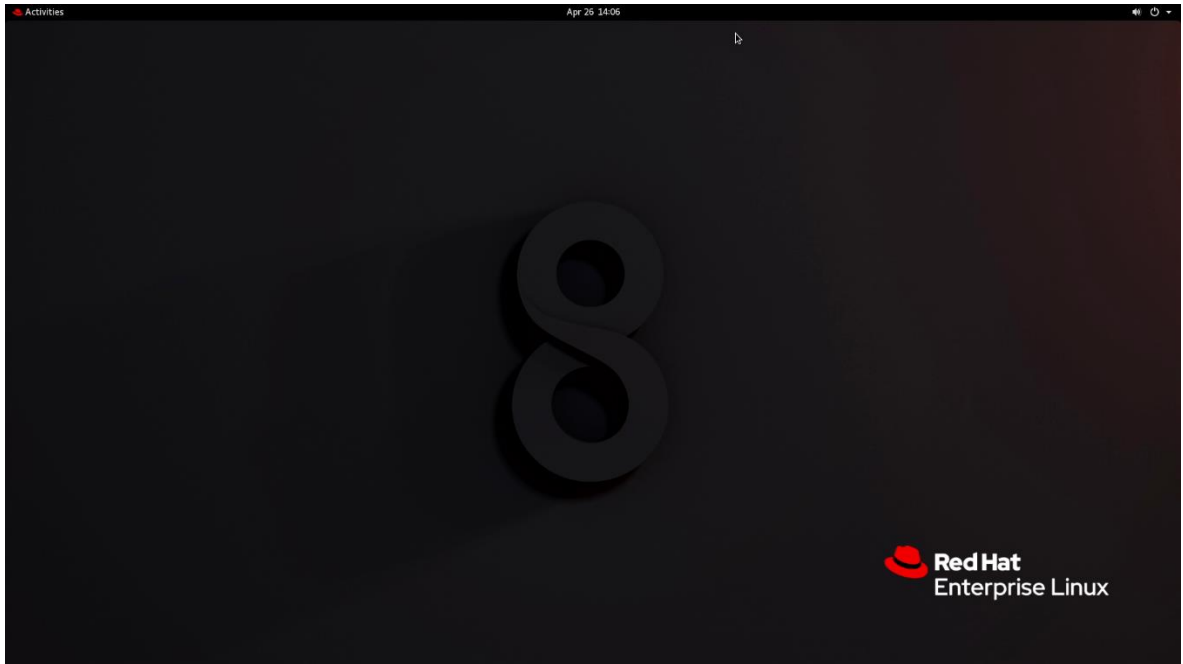
- Select “FINISH CONFIGURATION”.



- Log in to the Linux Desktop using the login credentials created above.



- Red Hat Enterprise Linux 8.6 Desktop screen.

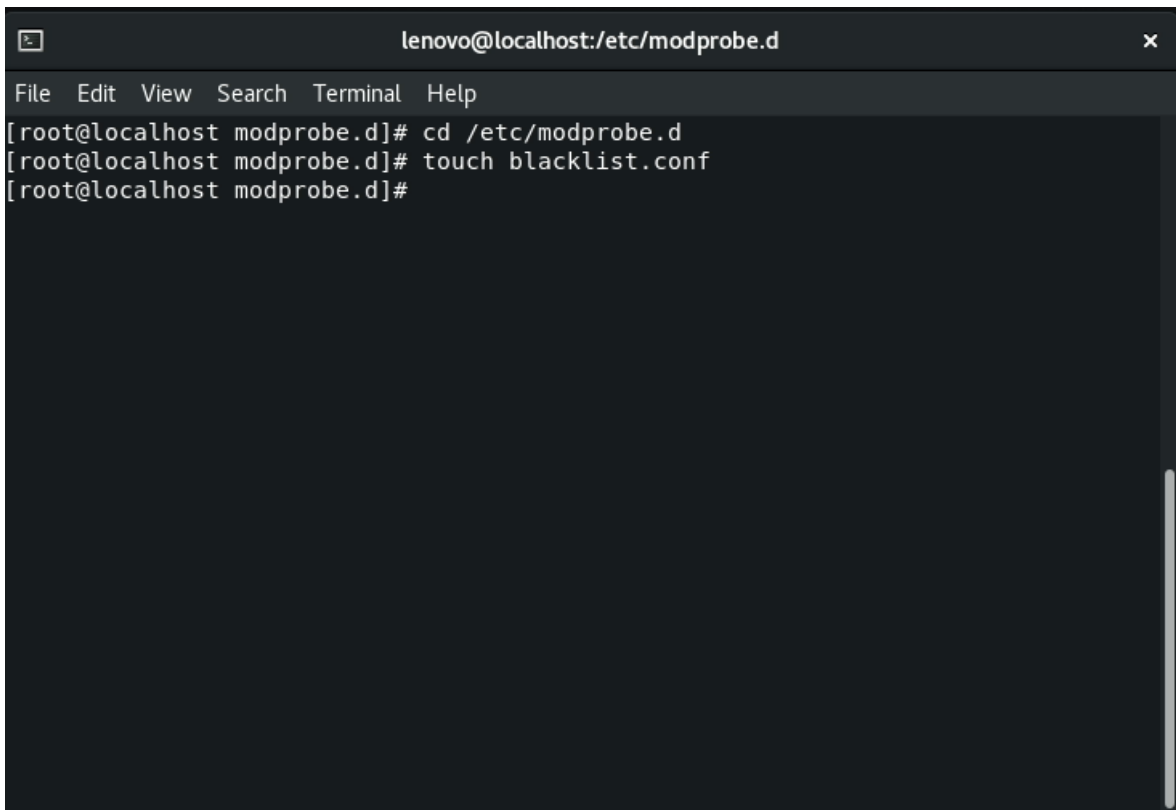


Lenovo

Section 3 – Installing the Nvidia Graphics Driver

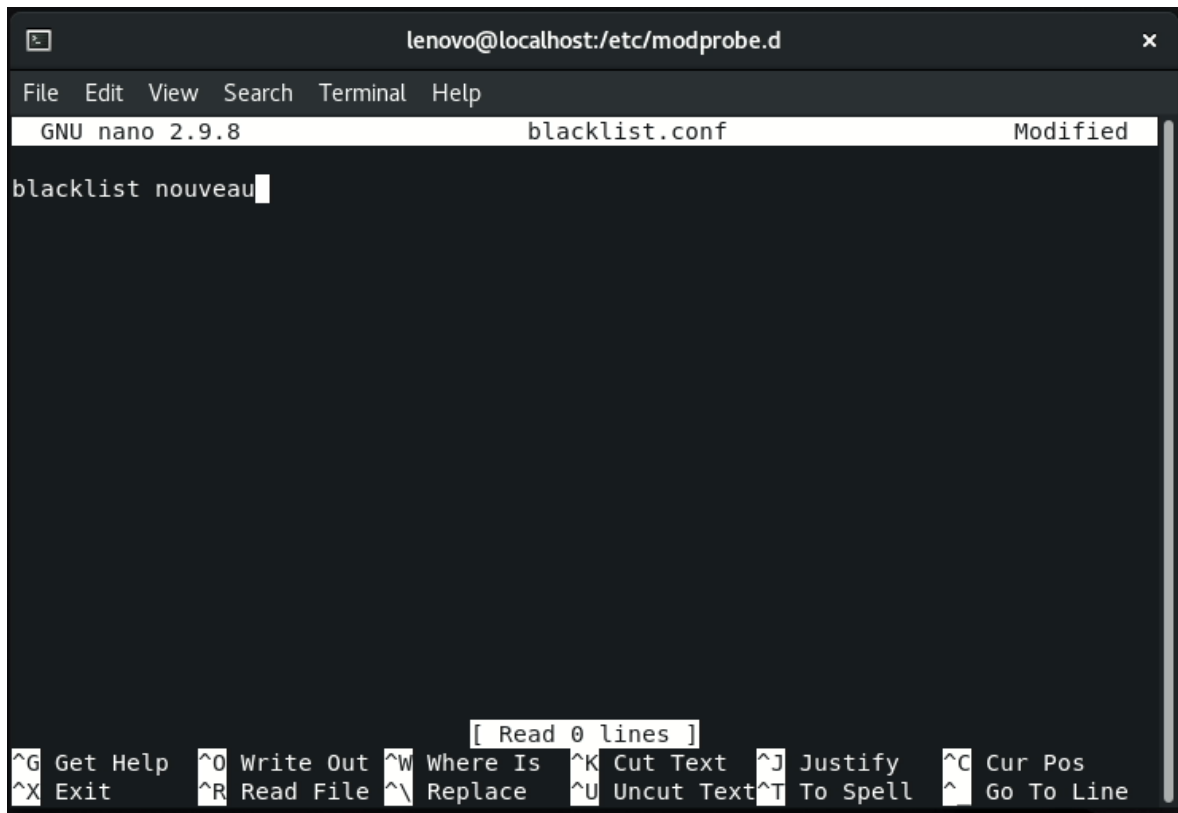
In order to get optimal performance out of the Nvidia GPU, it is a good idea to install the Nvidia graphics driver.

- Download the latest Nvidia graphics driver for the appropriate Nvidia GPU from <http://www.nvidia.com/download>
- Blacklist the Linux Nouveau driver by following the steps below.
- Open a terminal window and log in as root: su
- Enter /etc/modprobe.d directory and create a file named blacklist.conf



```
lenovo@localhost:/etc/modprobe.d
File Edit View Search Terminal Help
[root@localhost modprobe.d]# cd /etc/modprobe.d
[root@localhost modprobe.d]# touch blacklist.conf
[root@localhost modprobe.d]#
```

- Add a line blacklist nouveau in the blacklist.conf file, then save and exit.

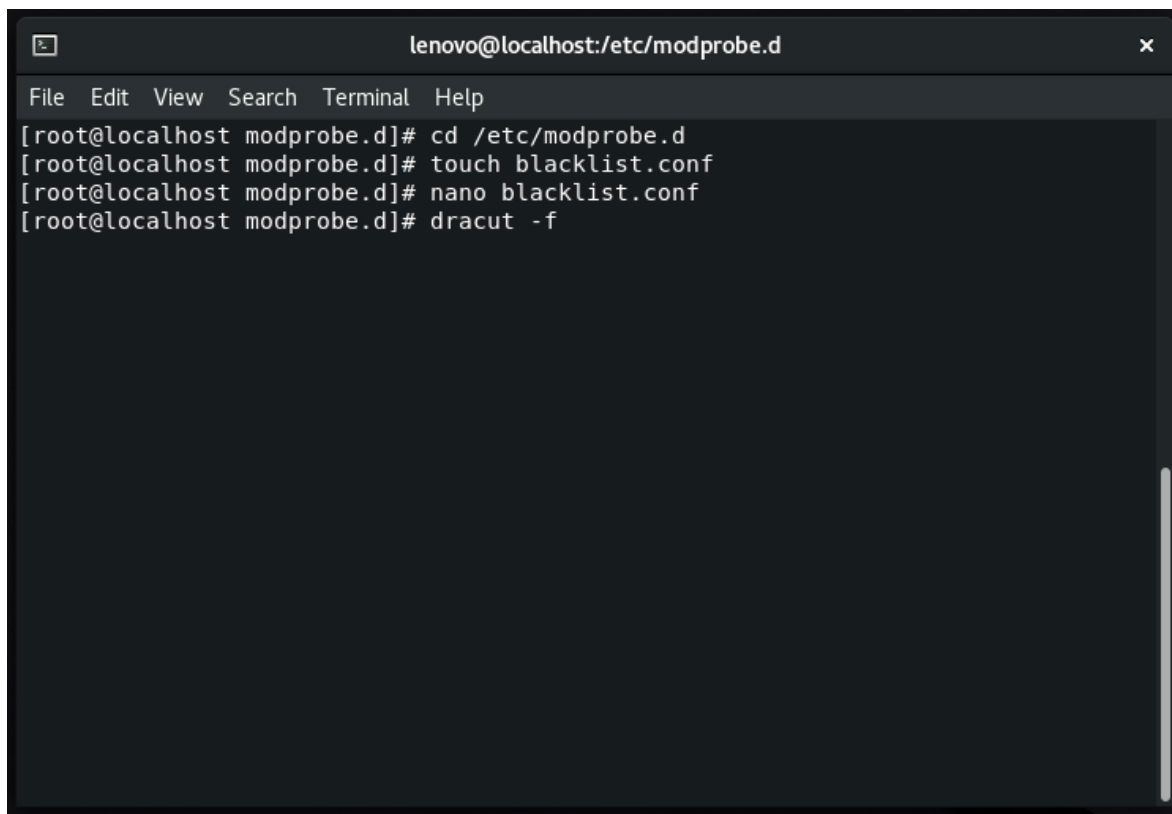


```
lenovo@localhost:/etc/modprobe.d
File Edit View Search Terminal Help
GNU nano 2.9.8 blacklist.conf Modified
blacklist nouveau
[ Read 0 lines ]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell ^_ Go To Line
```



- Run the command: `dracut -f` to update the `initramfs` file

Note: `yum` and `dnf` managers can be used for the next steps. In this example has been used `yum` manager.



```
lenovo@localhost:/etc/modprobe.d
File Edit View Search Terminal Help
[root@localhost modprobe.d]# cd /etc/modprobe.d
[root@localhost modprobe.d]# touch blacklist.conf
[root@localhost modprobe.d]# nano blacklist.conf
[root@localhost modprobe.d]# dracut -f
```

- Install all prerequisites using the following commands-
`yum groupinstall "Development Tools"`
`yum install elfutils-libelf-devel`

Note: If you don't have a valid RHEL subscription, install the packages above from the installation media. This will require manual intervention steps to modify the `yum` repository. Once done modifying the `yum` repository, install "Development Tools" and "elfutils-libelf-devel" as mentioned in the beginning of this step.

To manually update the yum repository, mount the RHEL installation media to your system and follow the steps below:

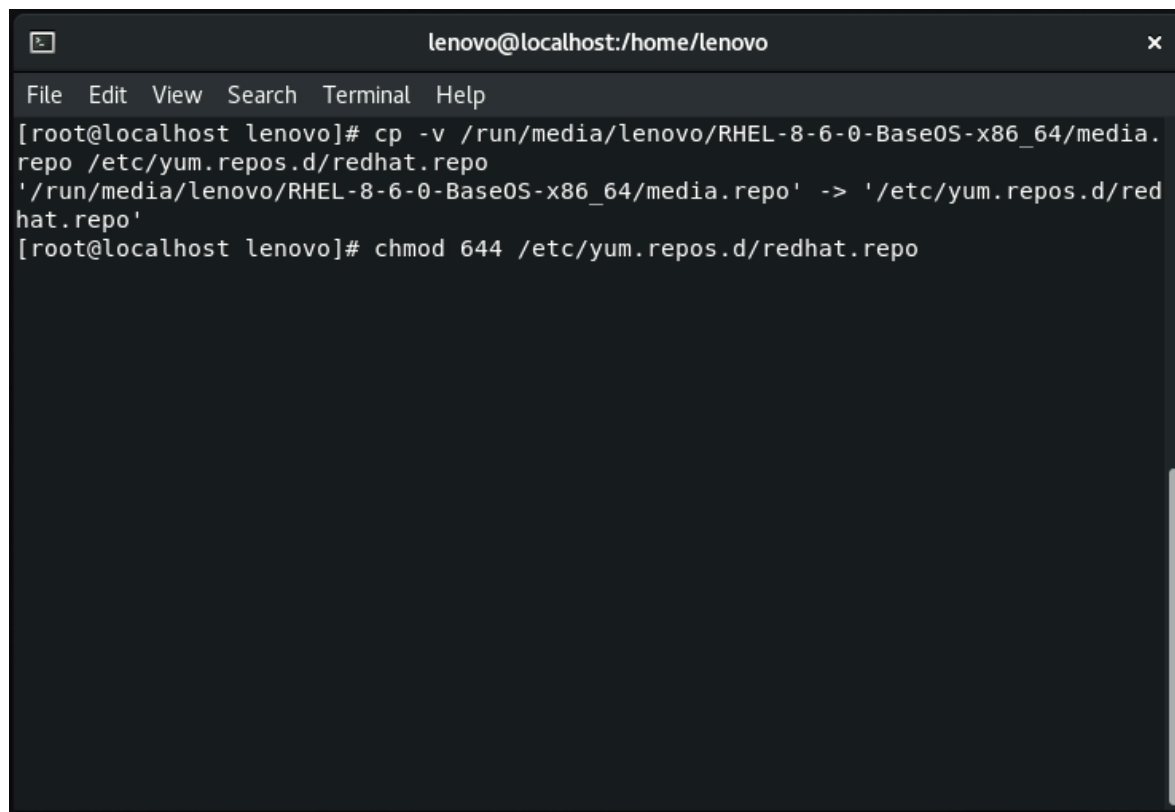
***Yellow highlighted text signifies directory path to installation media, so it may slightly vary for every user.

- Copy “media.repo” from the installation source to /etc/yum.repos.d/ directory.

```
# cp -v /run/media/lenovo/RHEL-8-6-0-/BaseOS-x86_64/media.repo  
/etc/yum.repos.d/redhat.repo
```

- Set permission levels accordingly.

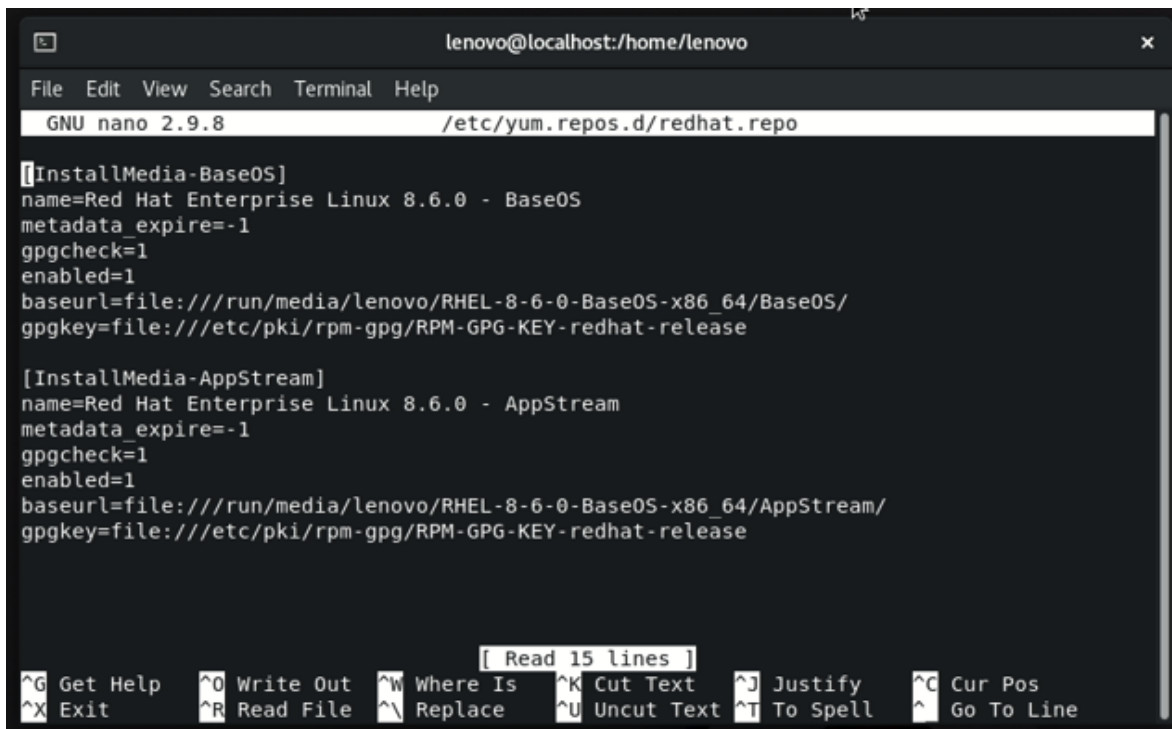
```
# chmod 644 /etc/yum.repos.d/redhat.repo
```



```
lenovo@localhost:/home/lenovo  
File Edit View Search Terminal Help  
[root@localhost lenovo]# cp -v /run/media/lenovo/RHEL-8-6-0-BaseOS-x86_64/media.  
repo /etc/yum.repos.d/redhat.repo  
'/run/media/lenovo/RHEL-8-6-0-BaseOS-x86_64/media.repo' -> '/etc/yum.repos.d/red  
hat.repo'  
[root@localhost lenovo]# chmod 644 /etc/yum.repos.d/redhat.repo
```

- Edit the redhat.repo file using gedit or vi or nano to look something like this:

```
[InstallMedia-BaseOS]
name=Red Hat Enterprise Linux 8.6.0 – BaseOS
metadata_expire=-1
gpgcheck=1
enabled=1
baseurl=file:///run/media/lenovo/RHEL-8-6-0-x86_64/BaseOS/
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release
[InstallMedia-AppStream]
name=Red Hat Enterprise Linux 8.6.0 – BaseOS
metadata_expire=-1
gpgcheck=1
enabled=1
baseurl=file:///run/media/lenovo/RHEL-8-6-0-x86_64/AppStream/
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release
```



```
lenovo@localhost:/home/lenovo
File Edit View Search Terminal Help
GNU nano 2.9.8 /etc/yum.repos.d/redhat.repo

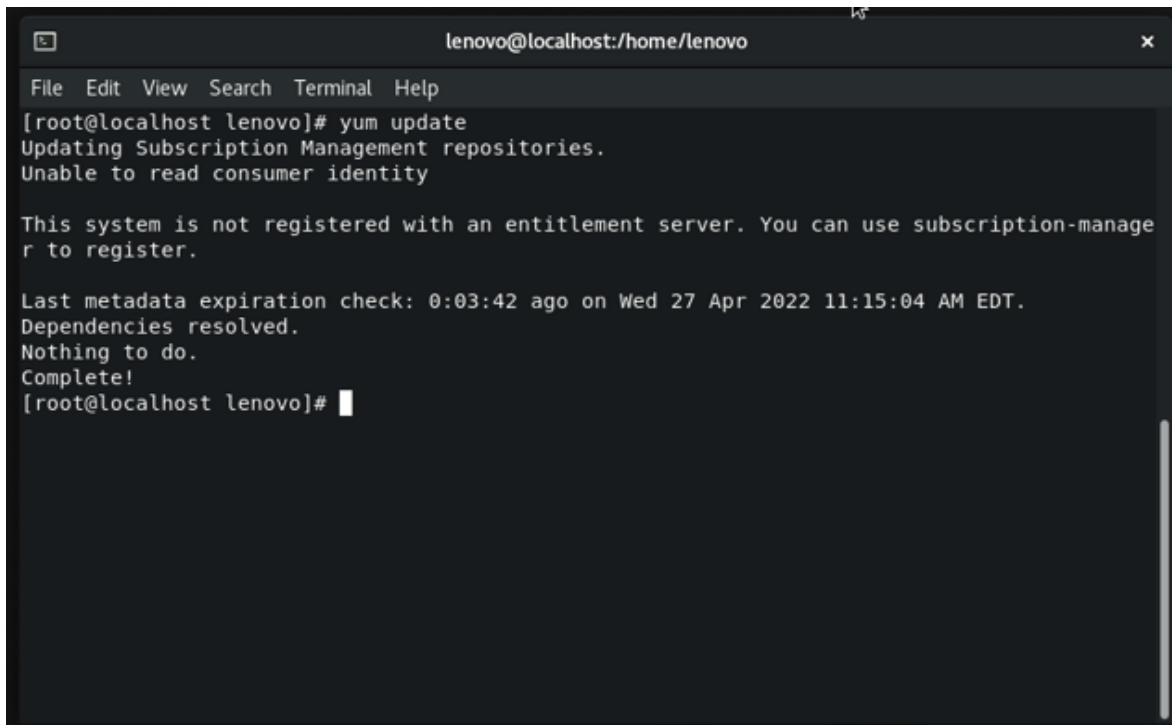
[[InstallMedia-BaseOS]
name=Red Hat Enterprise Linux 8.6.0 - BaseOS
metadata_expire=-1
gpgcheck=1
enabled=1
baseurl=file:///run/media/lenovo/RHEL-8-6-0-BaseOS-x86_64/BaseOS/
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release

[InstallMedia-AppStream]
name=Red Hat Enterprise Linux 8.6.0 - AppStream
metadata_expire=-1
gpgcheck=1
enabled=1
baseurl=file:///run/media/lenovo/RHEL-8-6-0-BaseOS-x86_64/AppStream/
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release

[ Read 15 lines ]
^G Get Help      ^O Write Out    ^W Where Is    ^K Cut Text    ^J Justify     ^C Cur Pos
^X Exit          ^R Read File   ^\ Replace     ^U Uncut Text ^T To Spell    ^_ Go To Line
```

- Once done editing the repo, do yum update:

```
# yum update
```

A terminal window titled 'lenovo@localhost:/home/lenovo' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal output shows the execution of 'yum update' and its results.

```
lenovo@localhost:/home/lenovo
File Edit View Search Terminal Help
[root@localhost lenovo]# yum update
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use subscription-manage
r to register.

Last metadata expiration check: 0:03:42 ago on Wed 27 Apr 2022 11:15:04 AM EDT.
Dependencies resolved.
Nothing to do.
Complete!
[root@localhost lenovo]#
```



- Once the yum update is complete, install the “Development Tools” and “elfutils-libelf-devel” with the help of commands mentioned in the beginning of Step 3.

```
lenovo@localhost:/home/lenovo
File Edit View Search Terminal Help
[root@localhost lenovo]# yum groupinstall "Development Tools"
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use subscription-manage
r to register.

Last metadata expiration check: 0:05:32 ago on Wed 27 Apr 2022 11:15:04 AM EDT.
Dependencies resolved.
=====
Package                Architecture  Version          Repository      Size
=====
Installing Groups:
Development Tools

Transaction Summary
=====
Is this ok [y/N]: y
Complete!
[root@localhost lenovo]#
```

```
lenovo@localhost:/home/lenovo
File Edit View Search Terminal Help
[root@localhost lenovo]# yum install elfutils-libelf-devel
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use subscription-manage
r to register.

Last metadata expiration check: 0:07:01 ago on Wed 27 Apr 2022 11:15:04 AM EDT.
Package elfutils-libelf-devel-0.186-1.el8.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[root@localhost lenovo]#
```

- Reboot the system.

Follow the steps below to install the Nvidia driver-

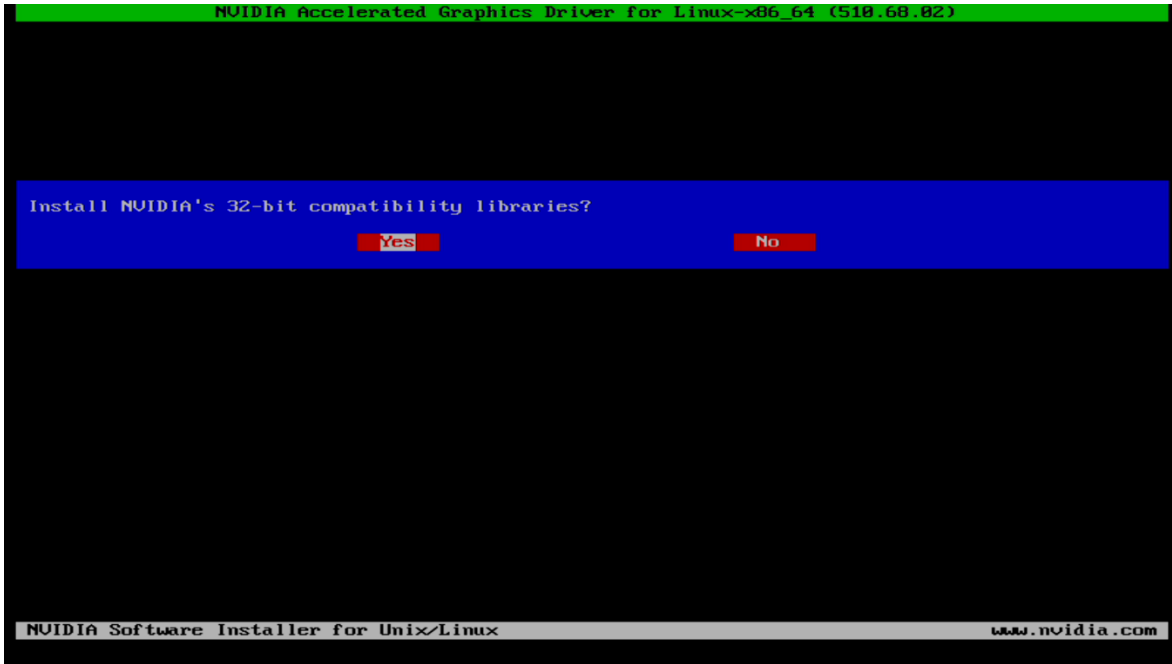
- Log in as root: su
- Type “init 3” to stop X-windows
- Navigate to the directory consisting of the Nvidia driver by using the command: cd directory_name
- Make the driver executable: chmod +x Nvidia_driver

```
[root@localhost lenovo]# cd /home/lenovo/Downloads
[root@localhost Downloads]# ls
NVIDIA-Linux-x86_64-510.68.02.run
[root@localhost Downloads]# chmod +x NVIDIA-Linux-x86_64-510.68.02.run
[root@localhost Downloads]#
```

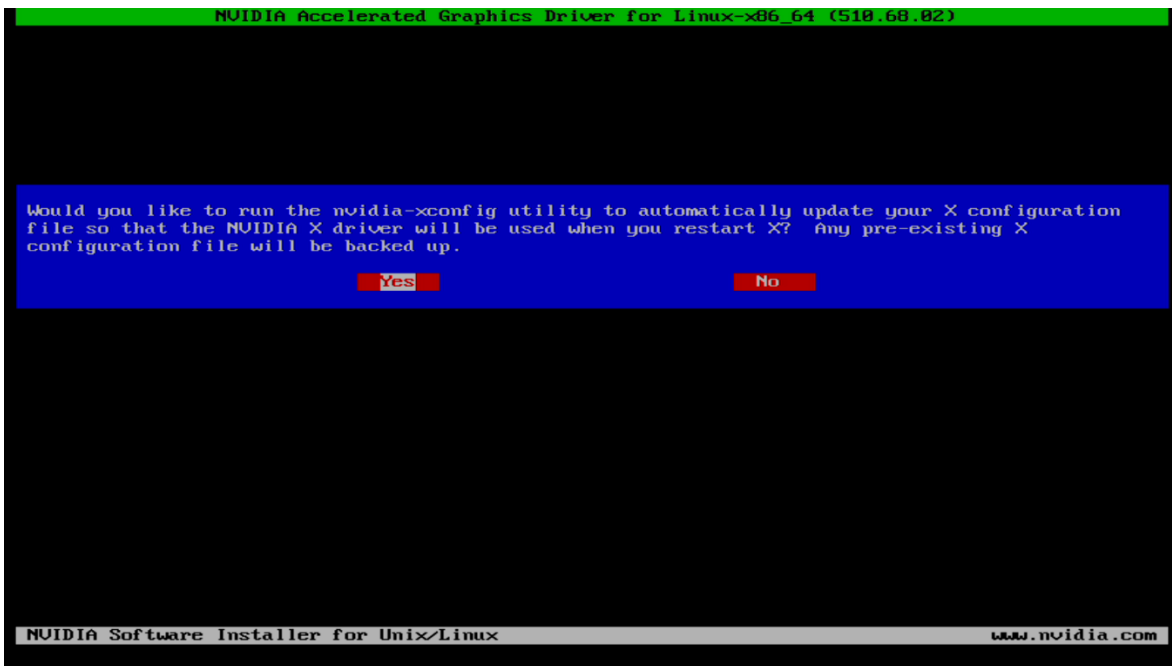
- Install the driver by using command: ./Nvidia_driver

```
[root@localhost Downloads]# ./NVIDIA-Linux-x86_64-510.68.02.run
Verifying archive integrity... OK
Uncompressing NVIDIA Accelerated Graphics Driver for Linux-x86_64 510.68.02.....
```

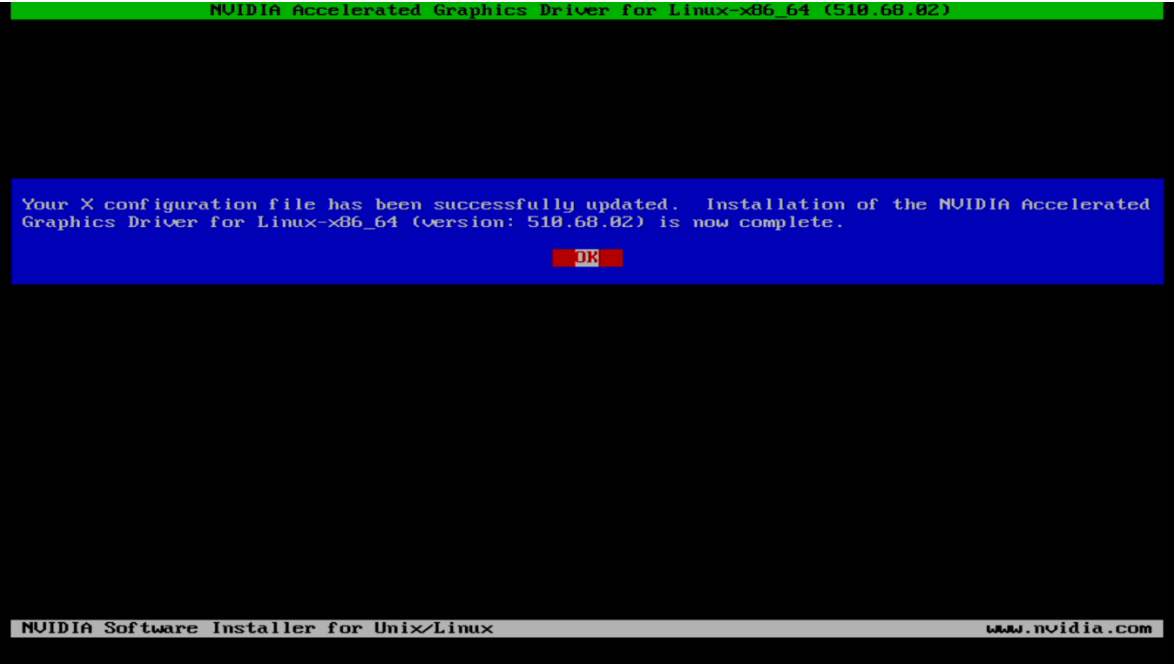
- Choose whether to install the 32-bit compatibility libraries



- Select "Yes" to update the X-configuration file to use the Nvidia X driver.



- Press “OK” when the screen shoots installation completed message.



- Execute the following command to verify the Nvidia driver is loaded: nvidia-smi

```
[root@localhost Downloads]# nvidia-smi
Wed Apr 27 11:49:21 2022
+-----+
| NVIDIA-SMI 510.68.02      Driver Version: 510.68.02      CUDA Version: 11.6      |
+-----+-----+
| GPU   Name                Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf    Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute M. |
|                                           MIG M.         |
+-----+-----+-----+
|  0   NVIDIA T600          Off          | 00000000:01:00:0 | Off      | N/A |
| 43%   46C    P0             N/A / 41W |  0MiB / 4096MiB |  0%      | Default |
|                                           N/A         |
+-----+-----+-----+
+-----+
| Processes:
| GPU   GI   CI          PID    Type   Process name                      GPU Memory
|   ID   ID   ID                                 Usage
+-----+
| No running processes found
+-----+
[root@localhost Downloads]# _
```

- Reboot the system.

Section 4 – Revision History

Version	Date	Author	Changes/Updates
1.1	7/12/2022	Aleksandr Panteleev	Added support for P360 Ultra
1.0	5/17/2022	Aleksandr Panteleev	Initial launch release