Red Hat Enterprise Linux 9 Installation

Lenovo ThinkStation PX, P7, P5

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Overview

The purpose of this document is to provide high-level guidance for users to adequately install a Red Hat Enterprise Linux 9 operating system on the ThinkStation PX, P7, and P5 platforms.

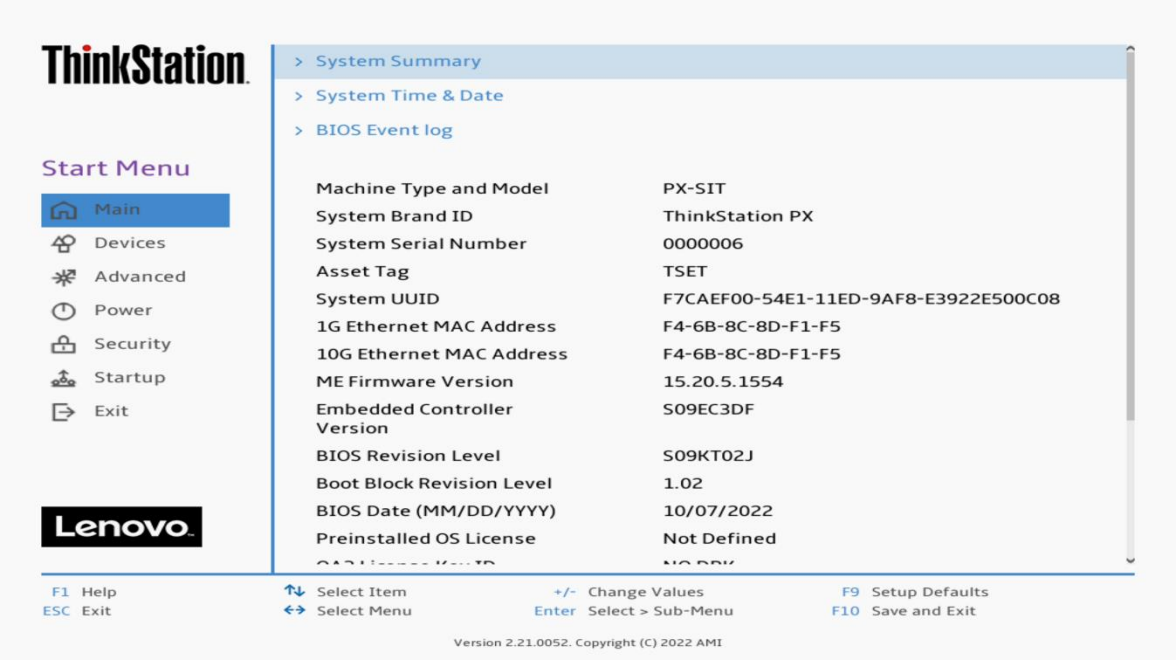
Section 1 – BIOS Setup

Prior to installing any operating system, it is important to make sure BIOS recognizes the storage devices appropriately.

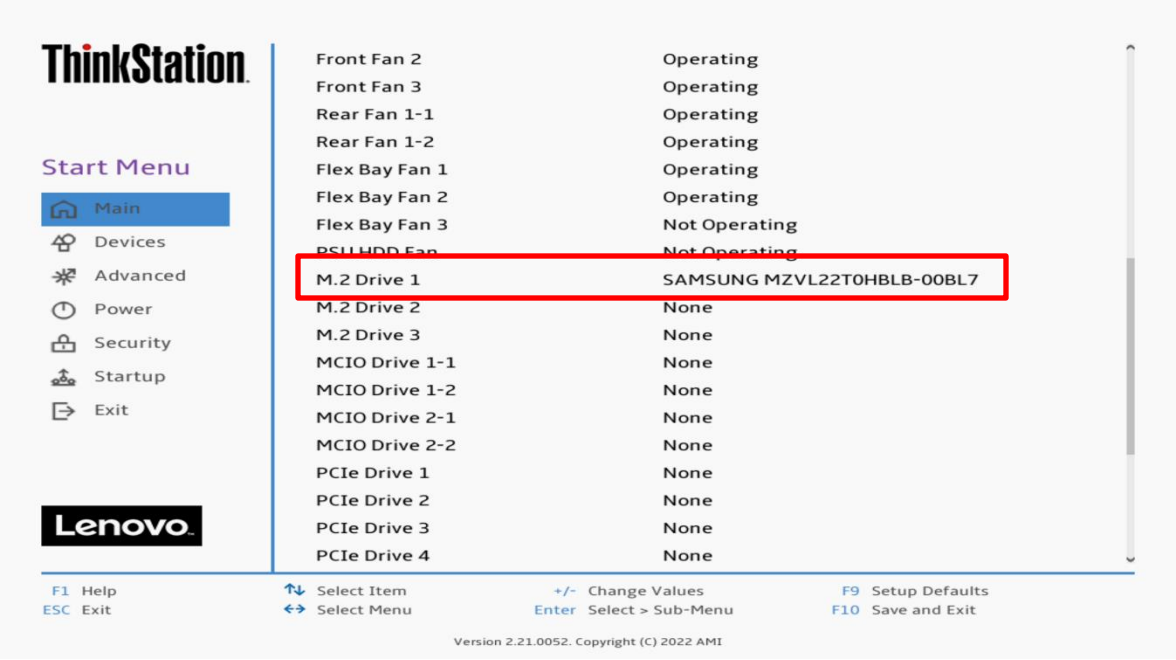
Here are some key items to look for within BIOS setup.

At the Lenovo splash screen, press the function key F1 to enter BIOS setup.

Select ‘System Summary’ from the main BIOS setup page.

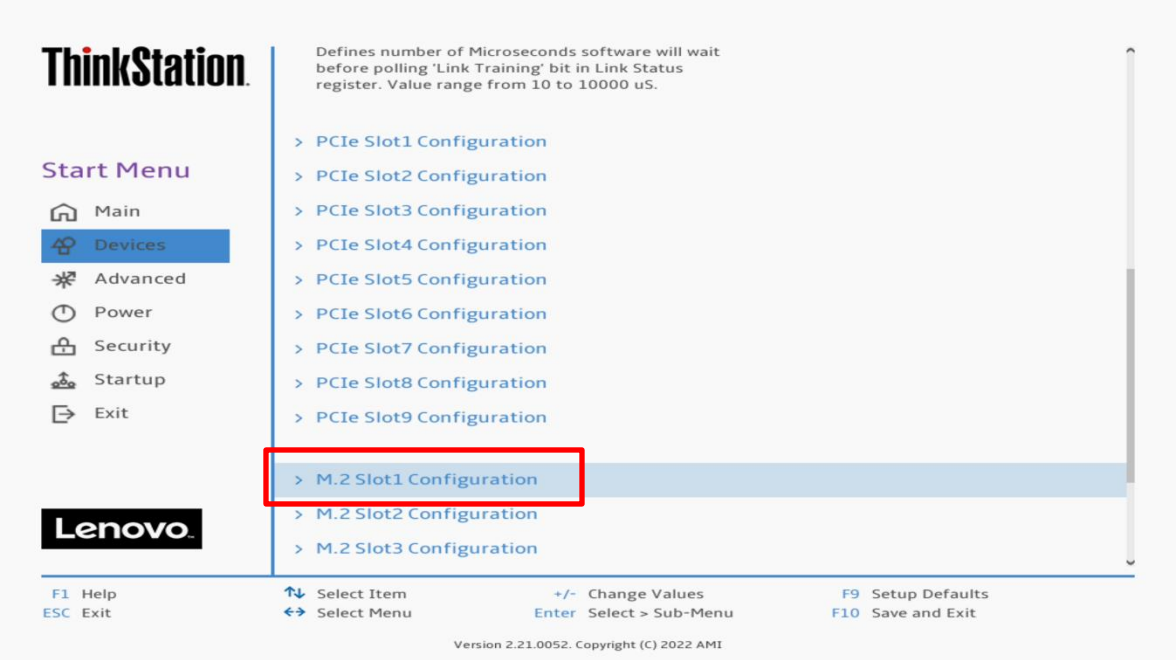


Scroll down through the list until you see the type of drive(s) you are intending to use. Note, drives may <u>not</u> show up here if drives are part of a RAID array.

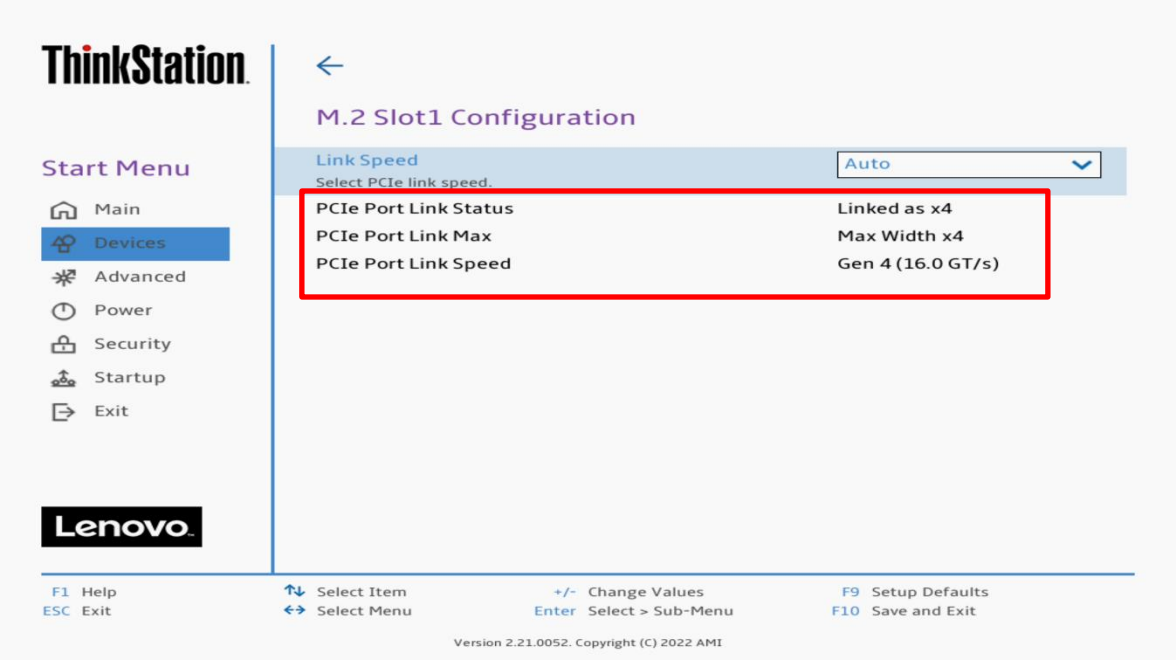


Select ‘Devices’ -> ‘Storage Setup’ to make sure the drive is enabled.

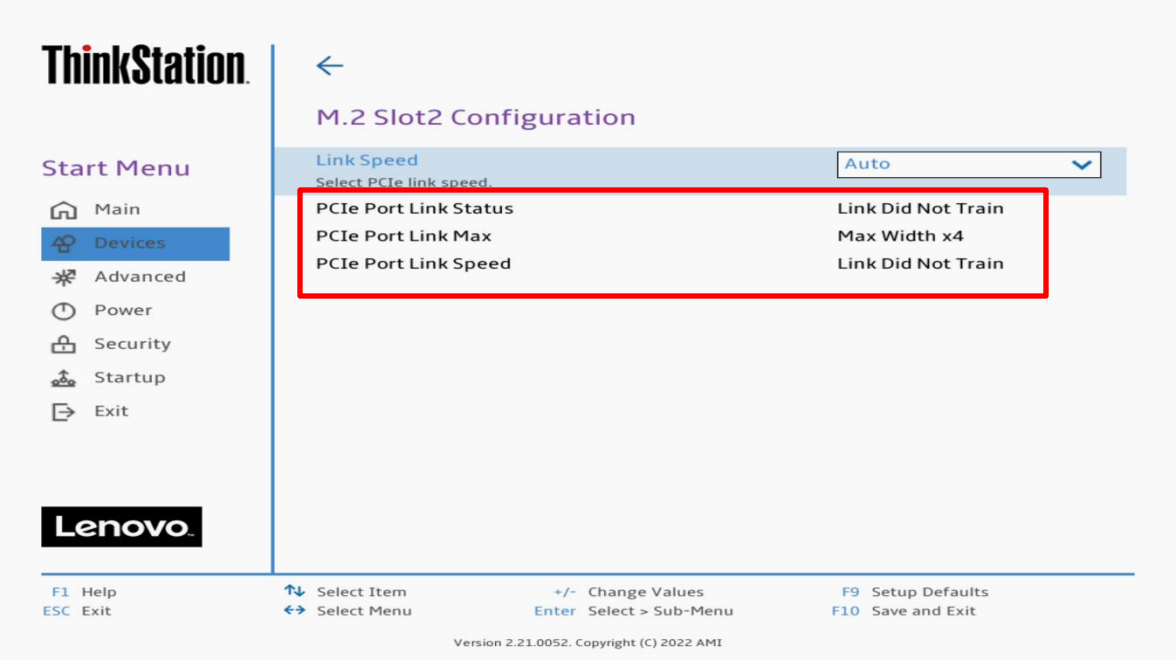
For PCIe drives, select ‘Devices’ -> ‘PCI Express Setup’ and select the slot for where the drive is physically installed. In this example, the M.2 drive is installed in Slot 1.



Make sure the drive is linking properly.



Here's an example of BIOS not recognizing a PCIe drive.



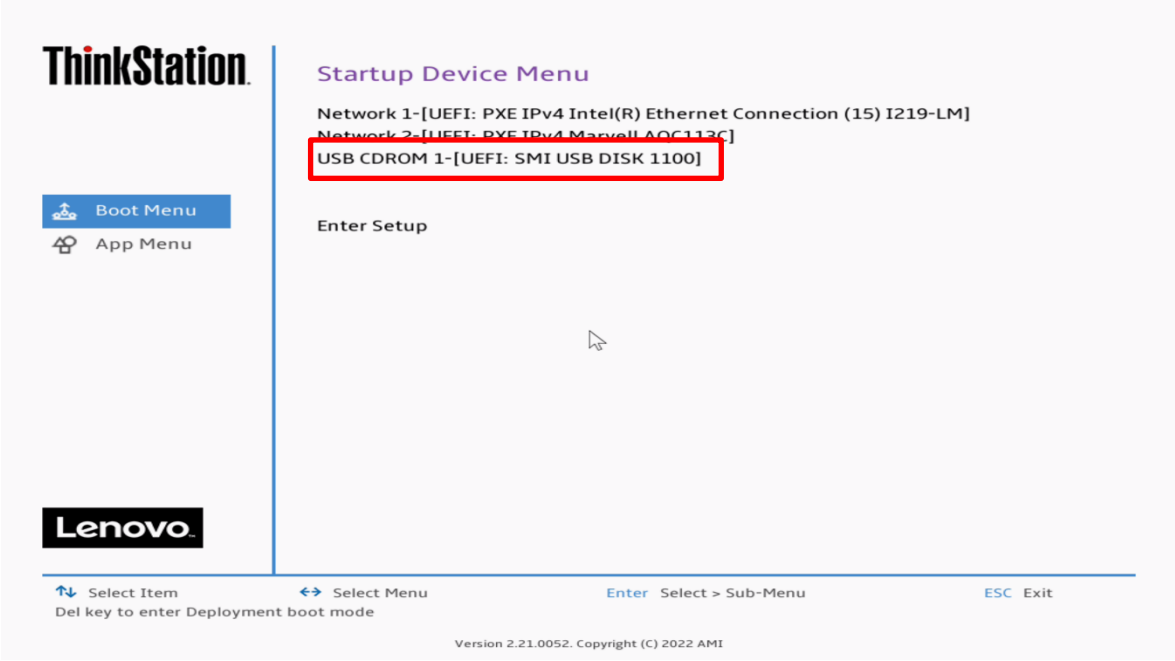
Section 2 – RHEL 9 Installation

Here are some step-by-step instructions on how to get a Red Hat Enterprise Linux 9 operating system installed on the ThinkStation PX, P7, and P5 systems.

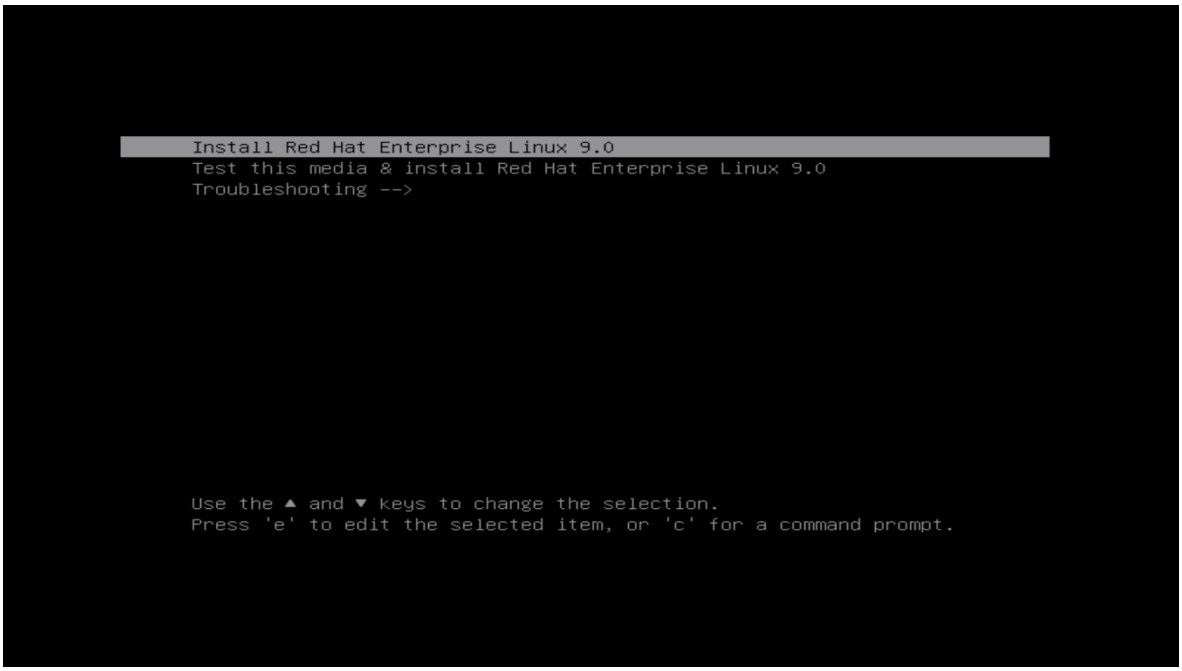
1. Obtain a copy of the RHEL 9 installation media. It is recommended to use Fedora Media Writer to make an installation USB with the appropriate RHEL 9 iso media.

2. Insert the USB memory key into one of the USB ports on the system and power on the system.

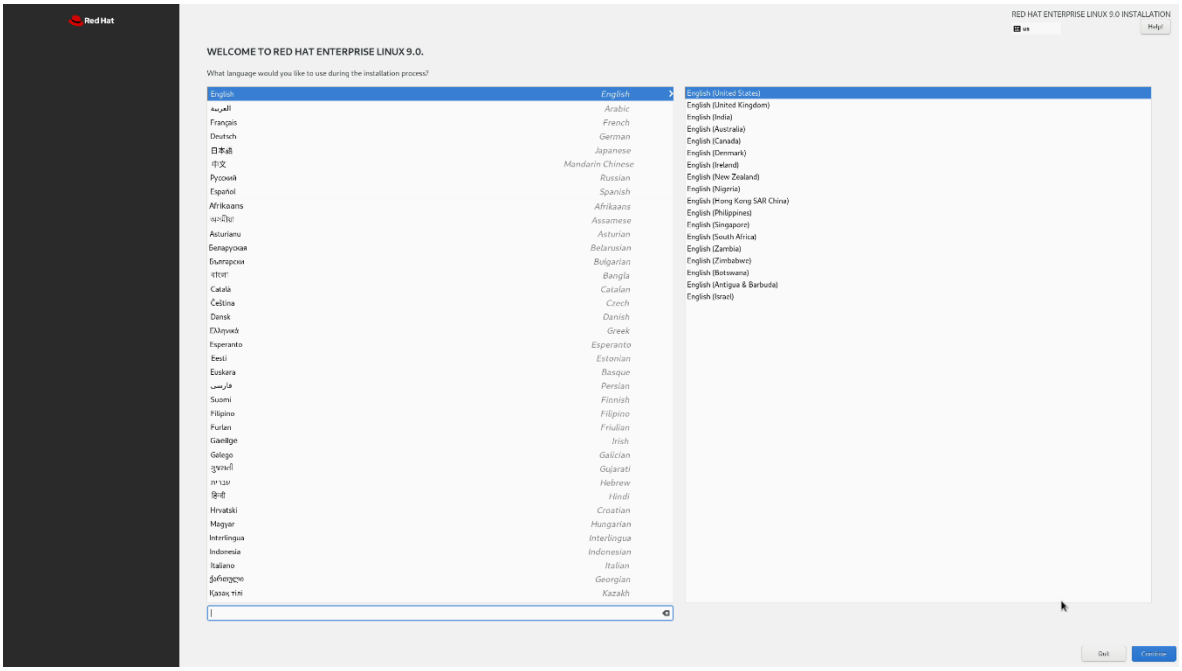
3. At the Lenovo splash screen, press the function F12 key to enter the BIOS startup menu and select the USB installation media from the list.



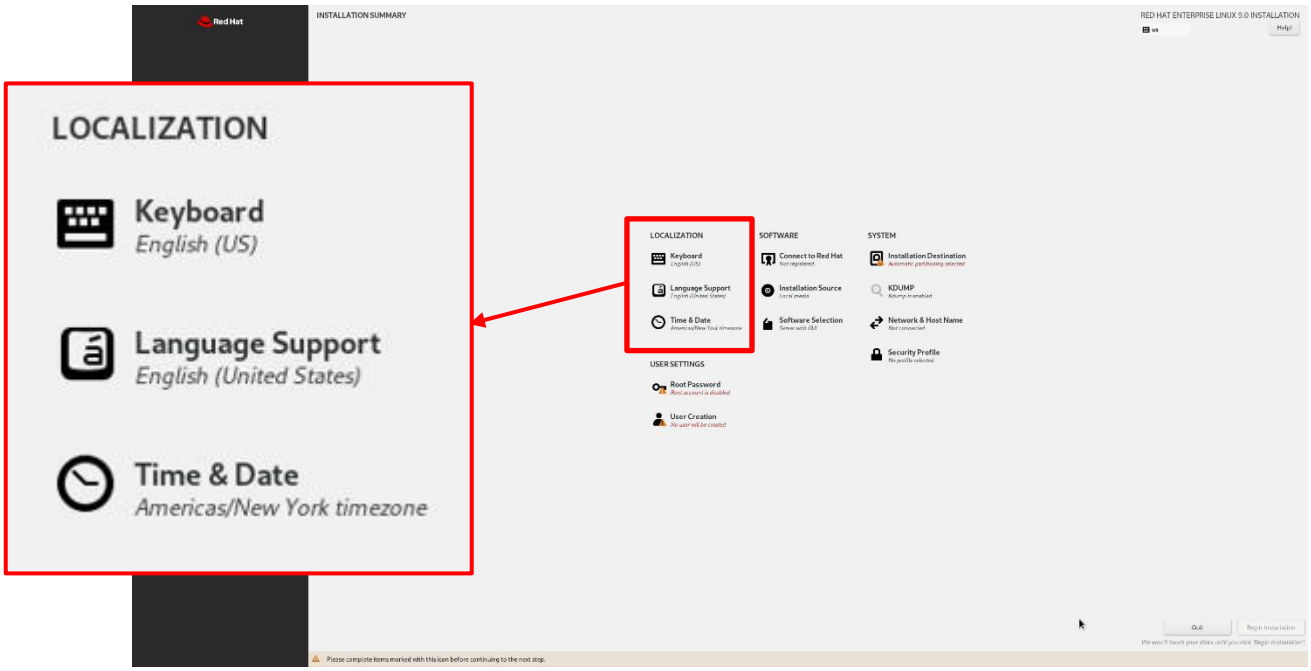
4. Select the ‘Install Red Hat Enterprise Linux 9.0’ option from the GRUB boot menu and press ‘Enter’.



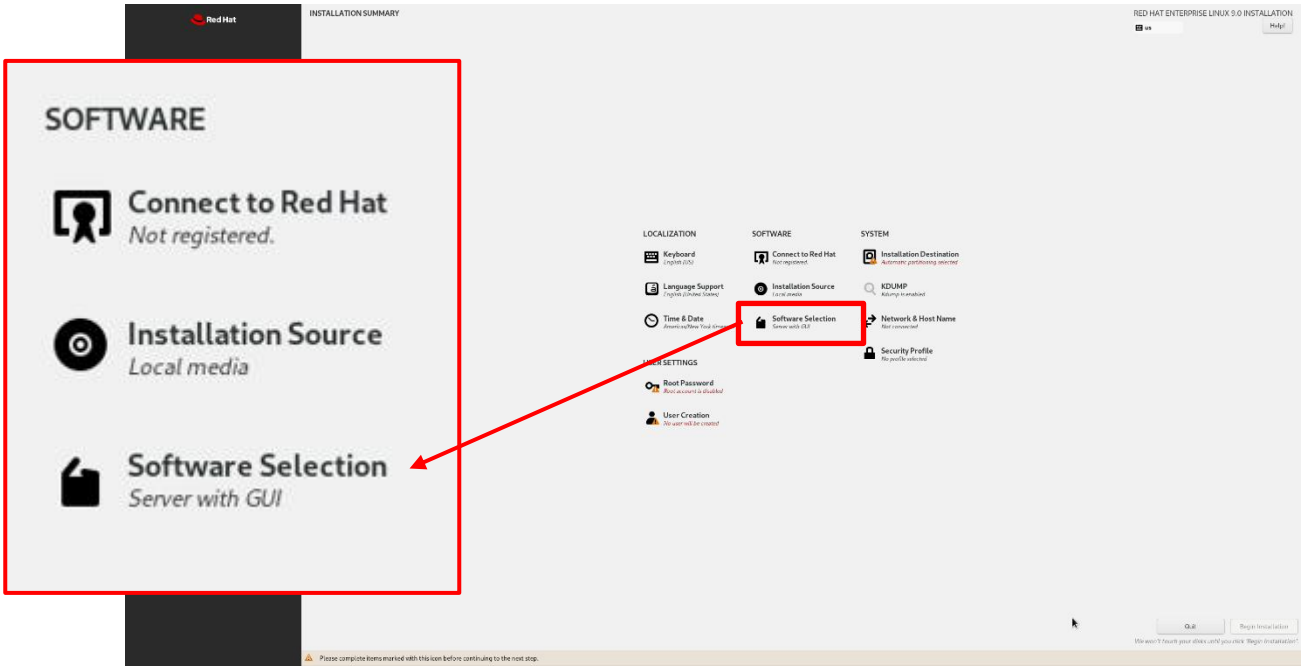
5. The Red Hat Enterprise Linux Welcome screen should appear. Select the appropriate language from the list of options and ‘Continue’.



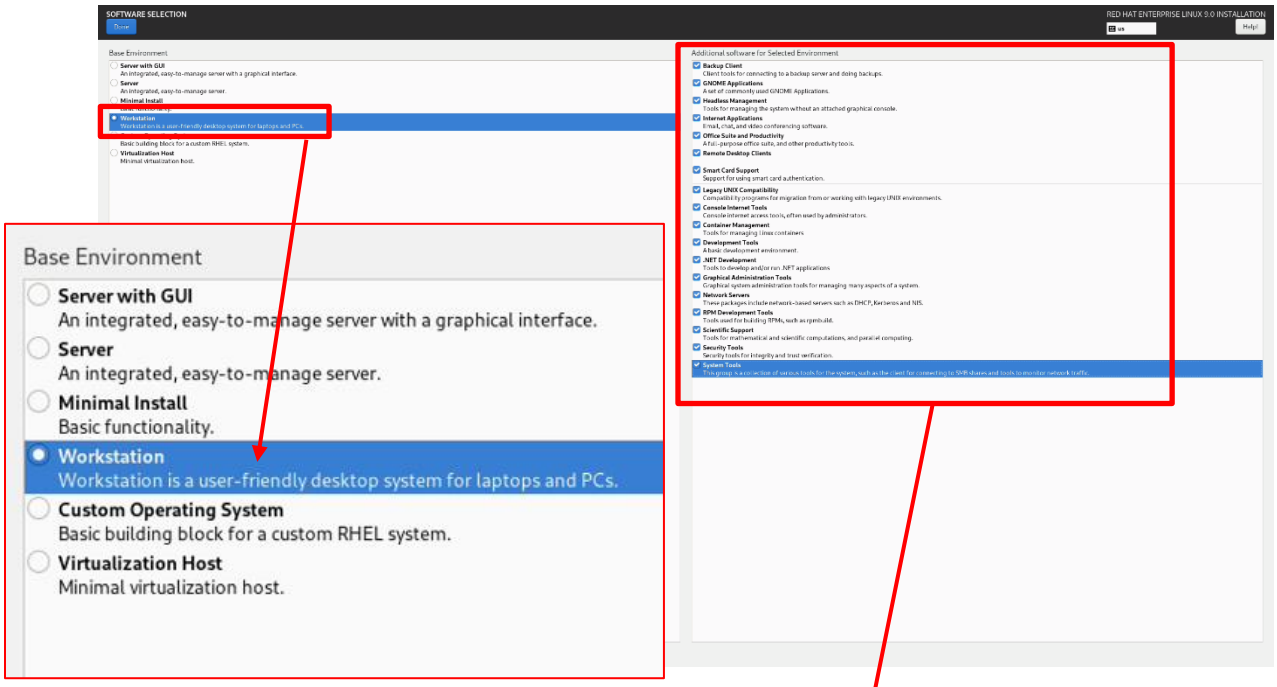
6. Adjust the ‘Keyboard’, ‘Language Support’, and ‘Time & Date’ accordingly by selecting each one. Or, leave the default settings.

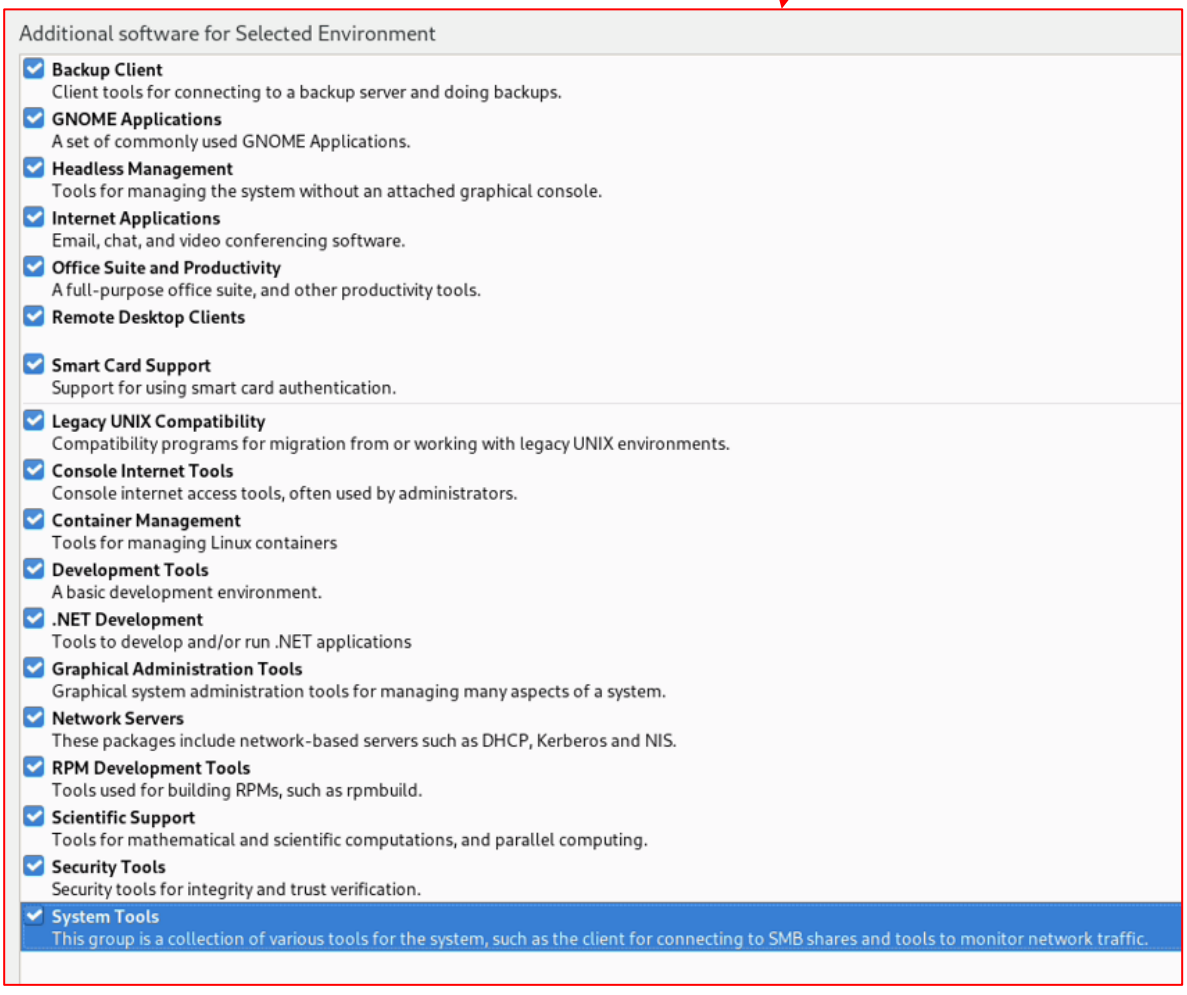


7. Select the ‘Software Selection’ and choose the type of software to install.

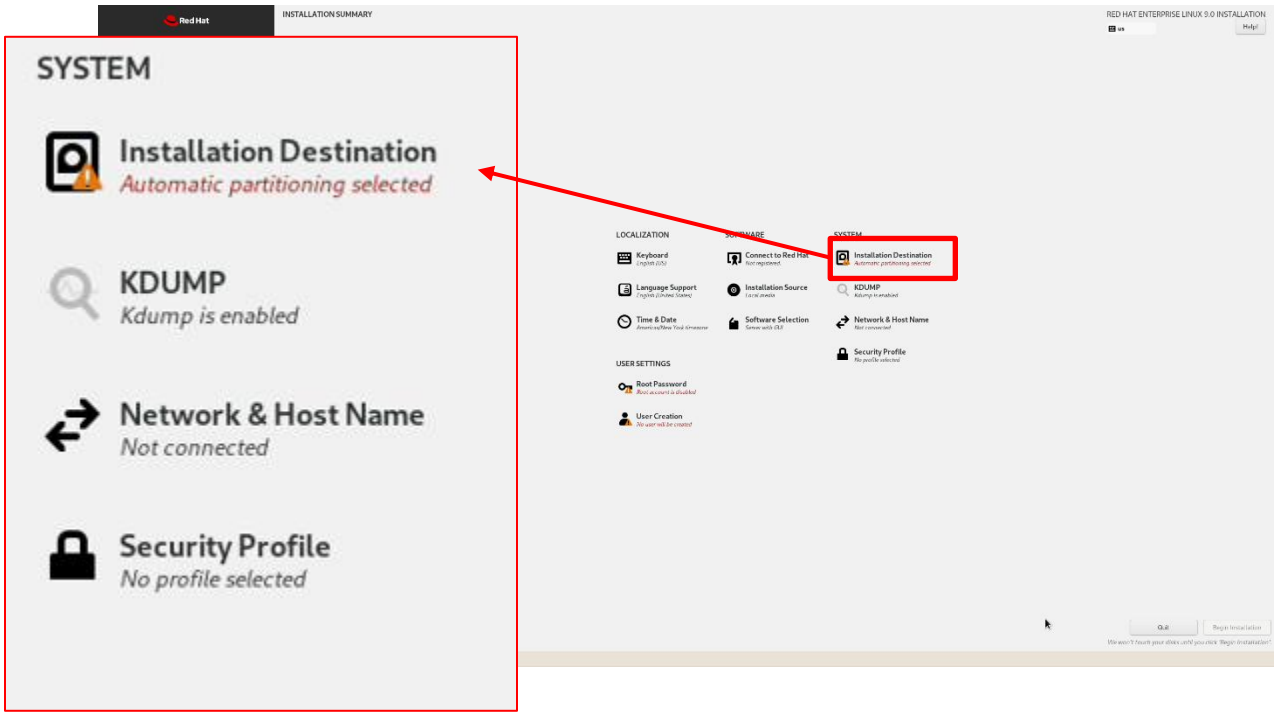


8. Select the type of ‘Base Environment’ as well as each additional software to install.
   In this example, ‘Workstation’ was selected for the ‘Base Environment’ and all additional software tools were selected.

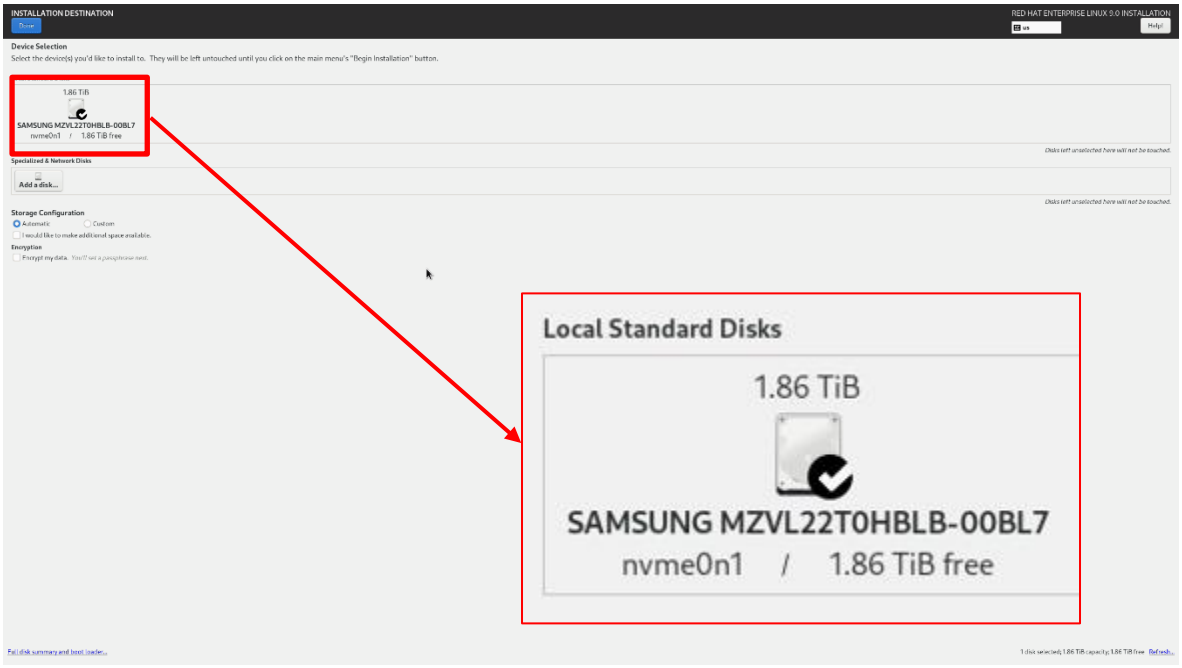




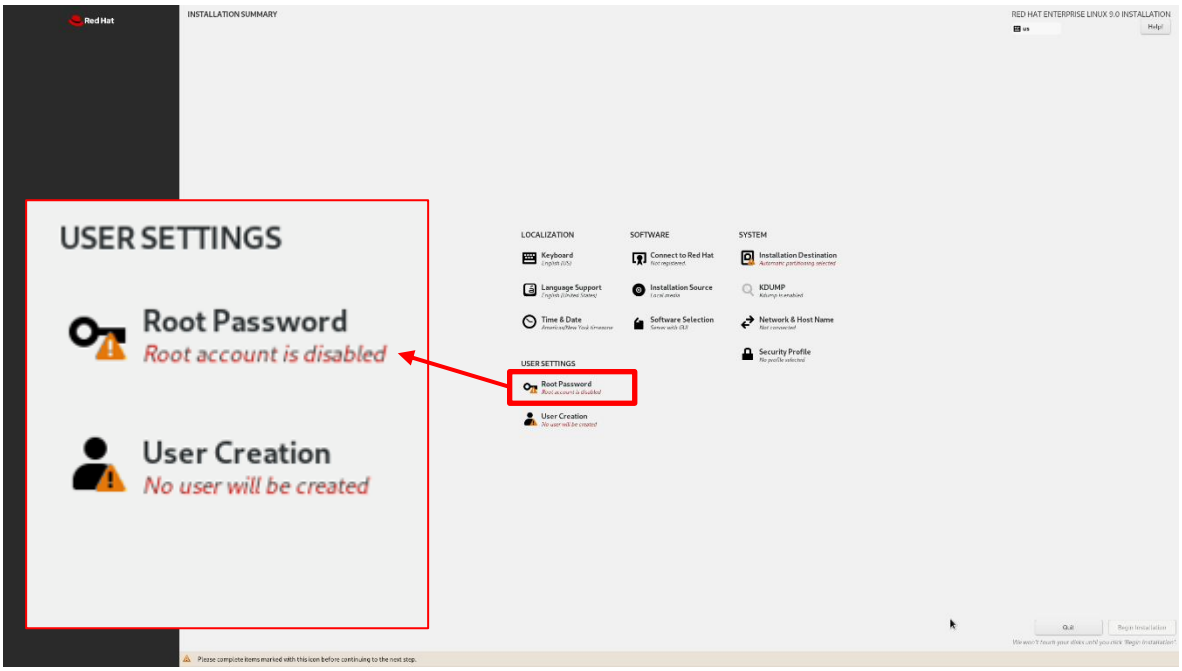
9. Select ‘Installation Destination’.



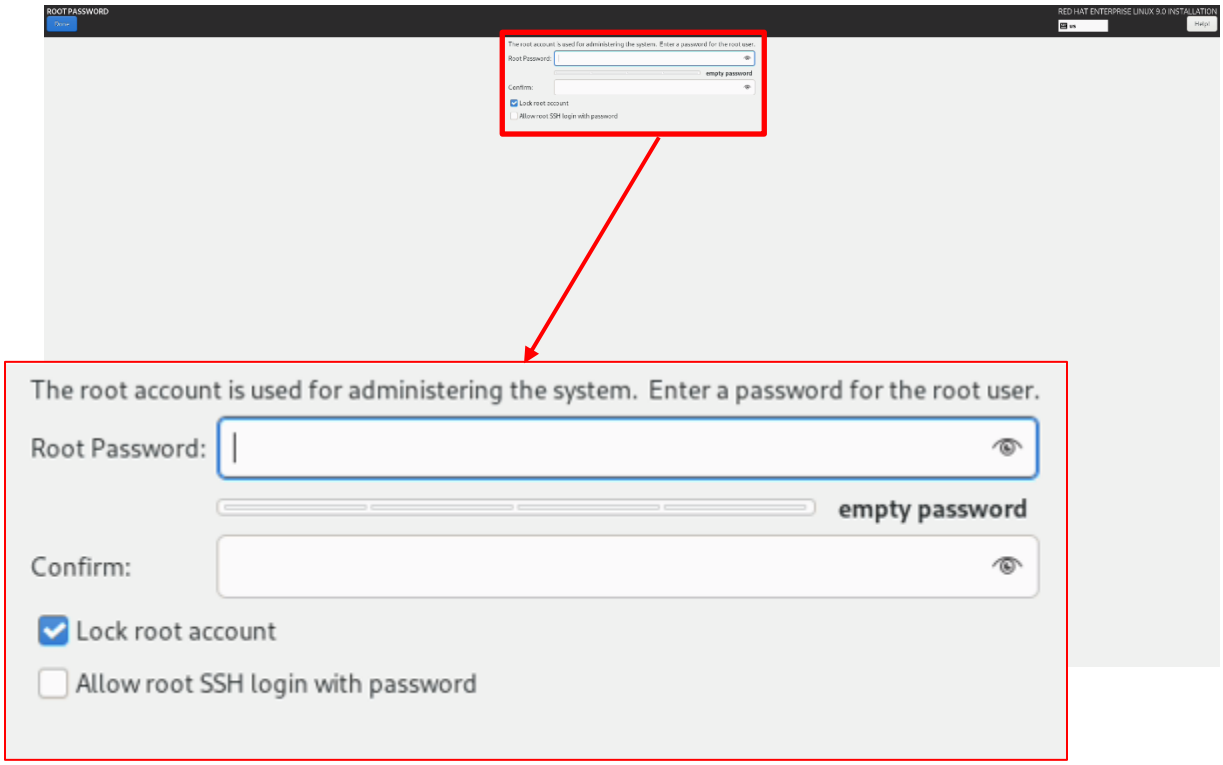
10. Select the device on where to install the operating system.



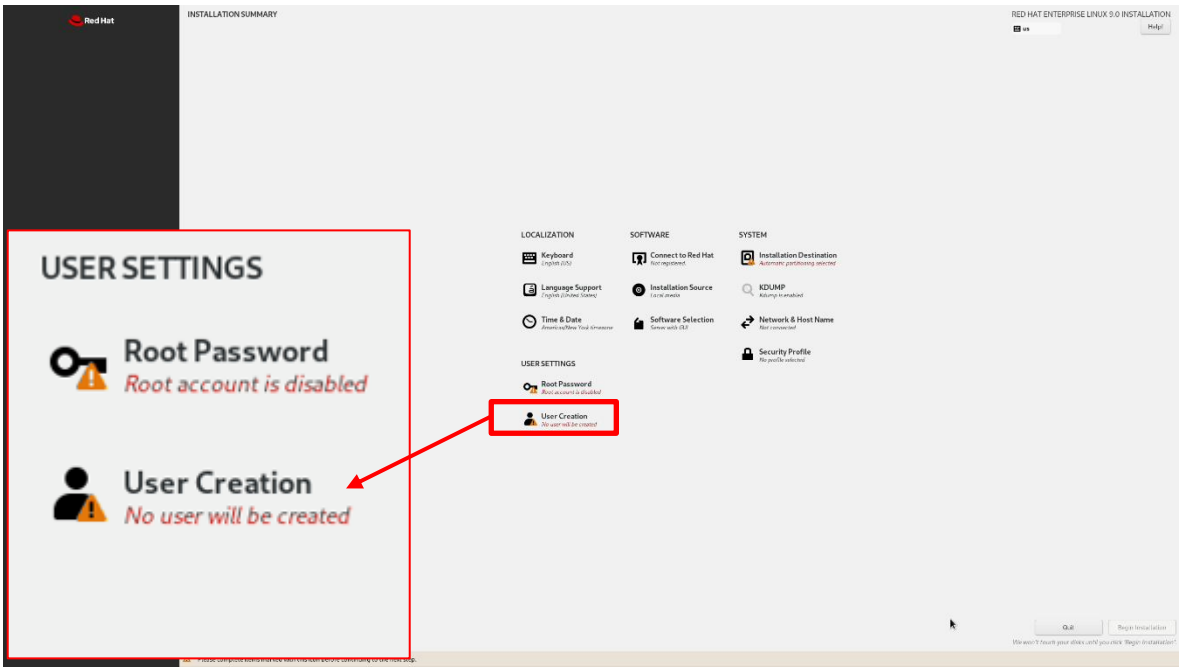
11. Select ‘Root Password’.



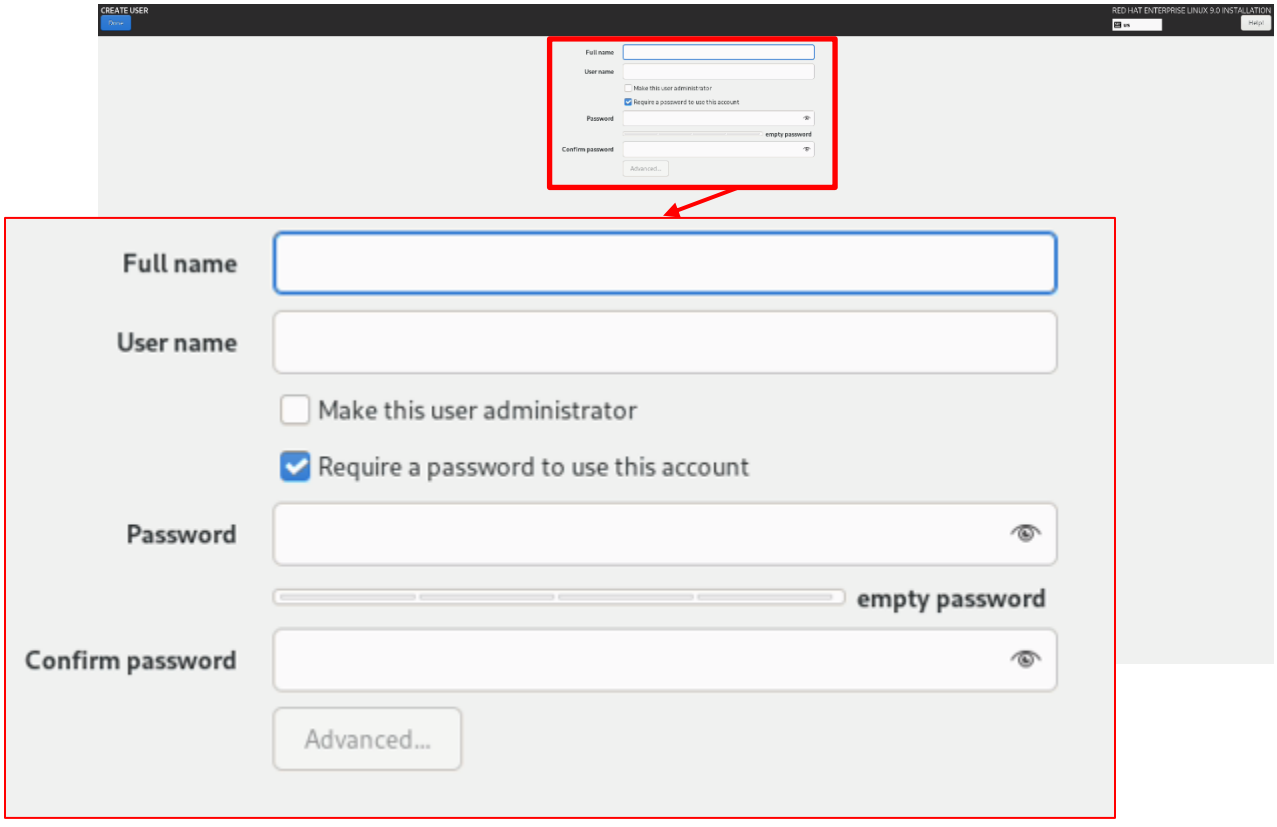
12. Enter a root password in both boxes below and select ‘Done’ in the upper left.



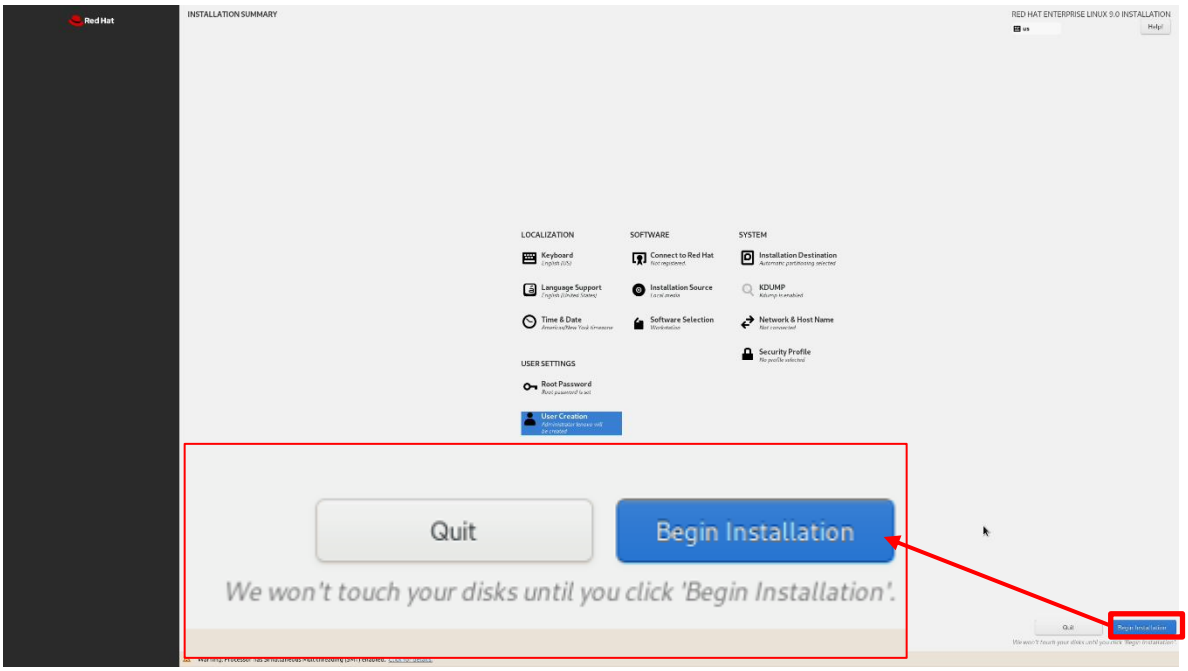
13. Select ‘User Creation’.



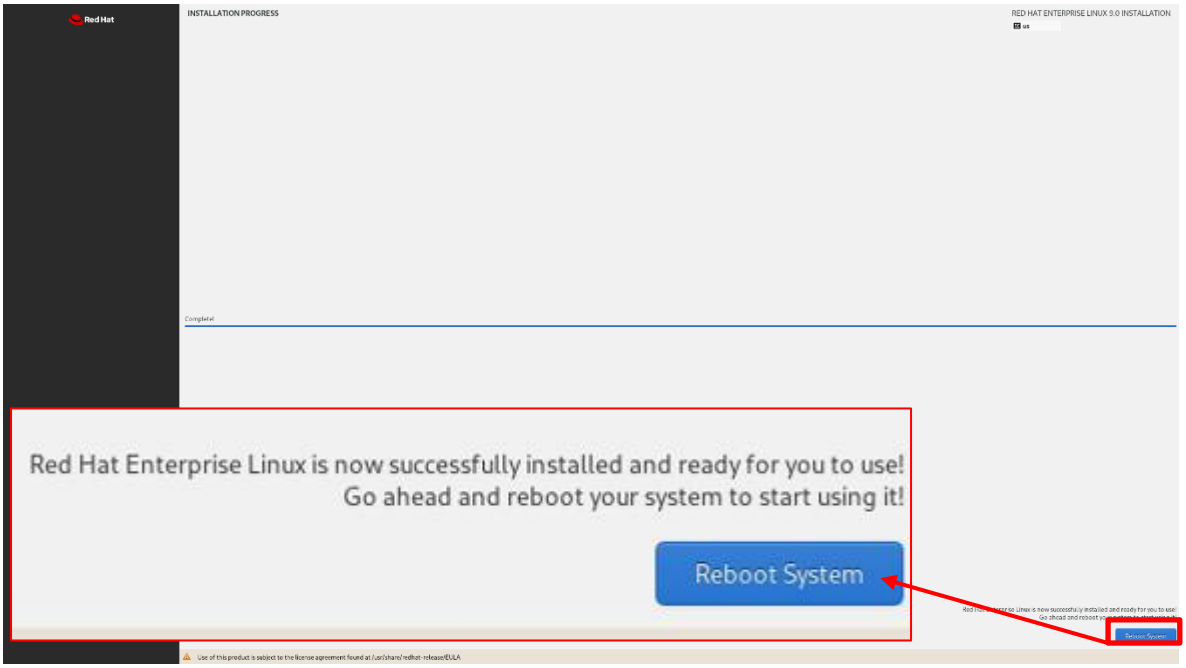
14. Fill in the appropriate boxes below and select ‘Done’ in the upper left.



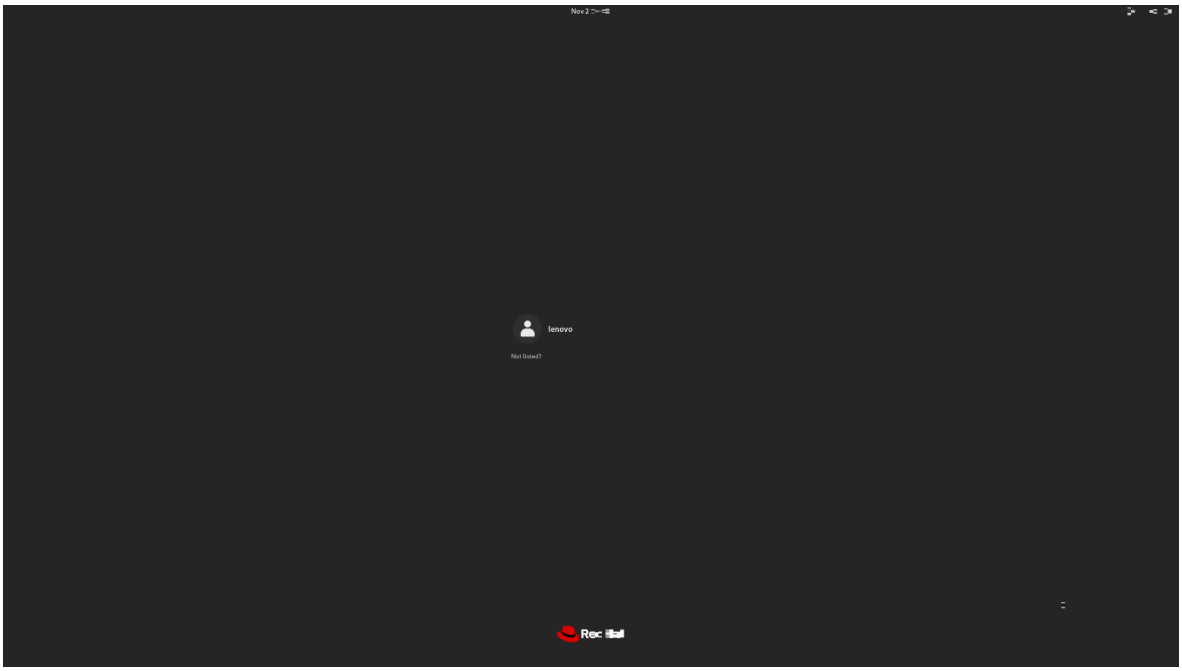
15. Select ‘Begin Installation’ to start the installation.



16. Once the installation completes, select ‘Reboot System’ at the bottom right.



17. Select the user icon and log in using the credentials created above.



18. Red Hat Enterprise Linux 9 Desktop screen.

Section 3 – Install Device Drivers

Most of the standard building blocks used in the ThinkStation PX, P7, and P5 platforms are native to the Red Hat Enterprise Linux 9 base kernel. It may be worth installing a proprietary graphics driver to get optimal performance from the graphics card. The next couple of sections provide some step-by-step instructions on how to install a proprietary Nvidia graphics driver in Red Hat Enterprise Linux.

Note, registering the system to the Red Hat subscription will allow for easy Linux updates. Here is a quick step to easily register and subscribe to the Red Hat subscription repositories.

```
# subscription-manager register

# subscription-manager auto-attach
```

Section 4 – Install Nvidia Proprietary Drivers

Here are some step-by-step instructions on how to install Nvidia proprietary drivers.

1. Download the appropriate Nvidia graphics driver.
2. Blacklist the Linux Nouveau driver.

   # nano /etc/modprobe.d/blacklist.conf

   - Add the following line, 'blacklist nouveau', and save and exit the file.

3. Update the initramfs file and reboot the system.

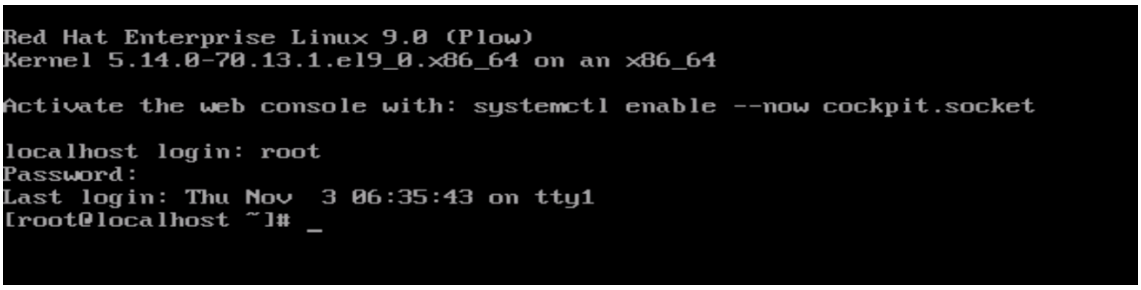
   # dracut --force

   # reboot now

4. Once the system reboots to the Linux desktop screen, run the following command as superuser from a terminal window to exit X-windows.

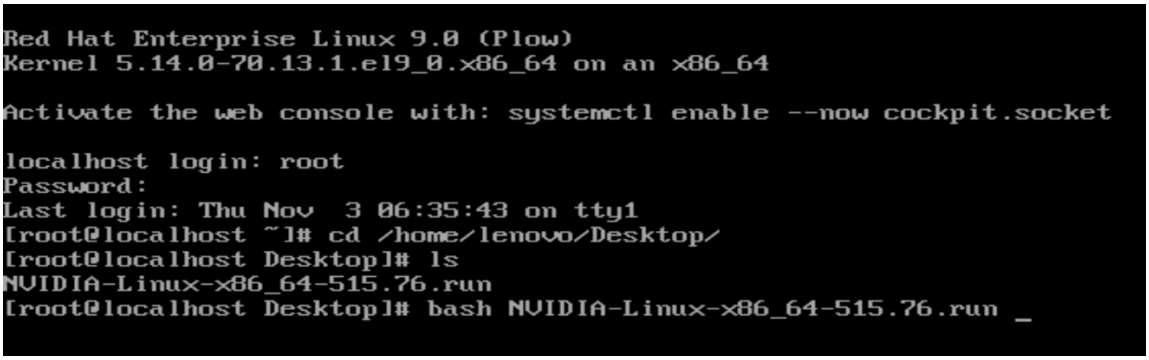
   # init 3

5. Login as root (superuser).

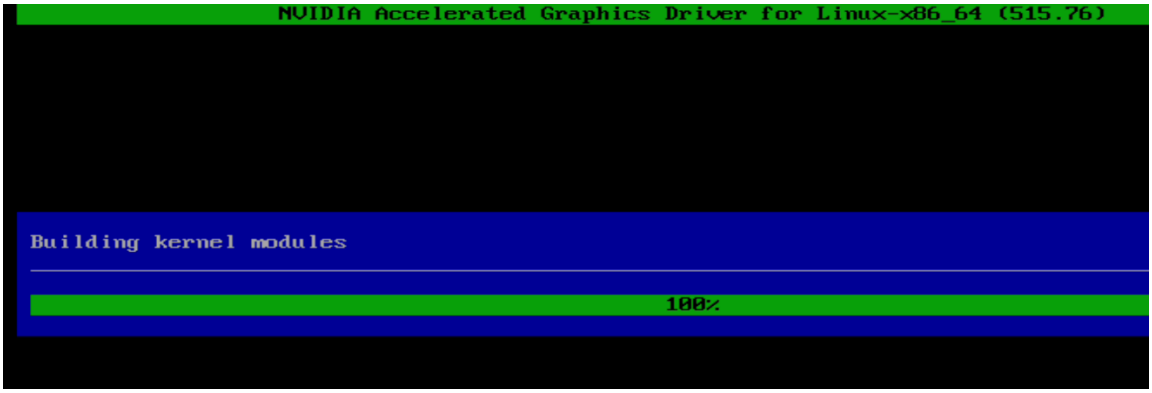


6. Browse to the directory to where the Nvidia driver installation file is located and run the following command. *In this example, it is on the Linux desktop.*

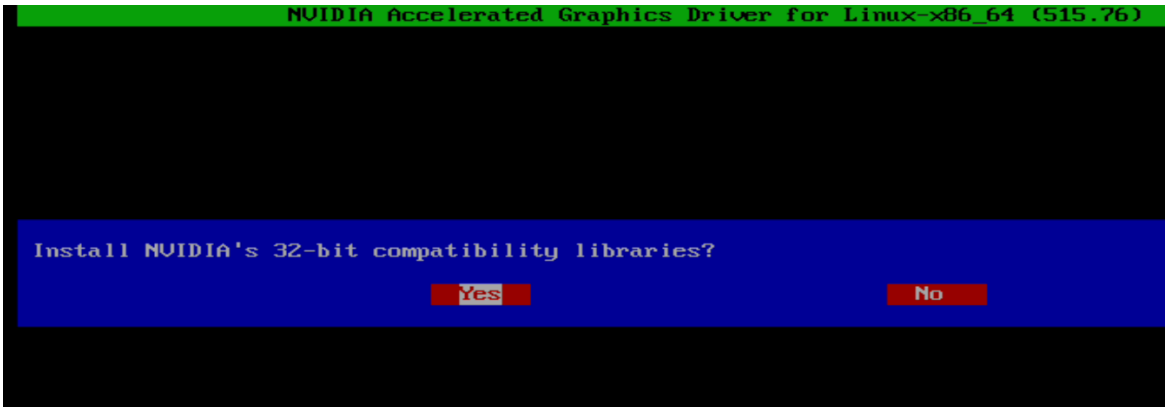
   # bash NVIDIA*



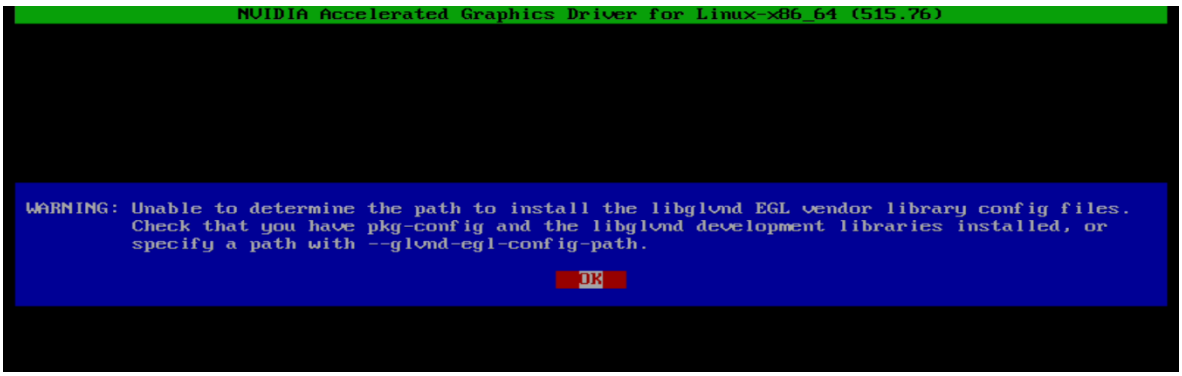
7. Note the driver should start to install.



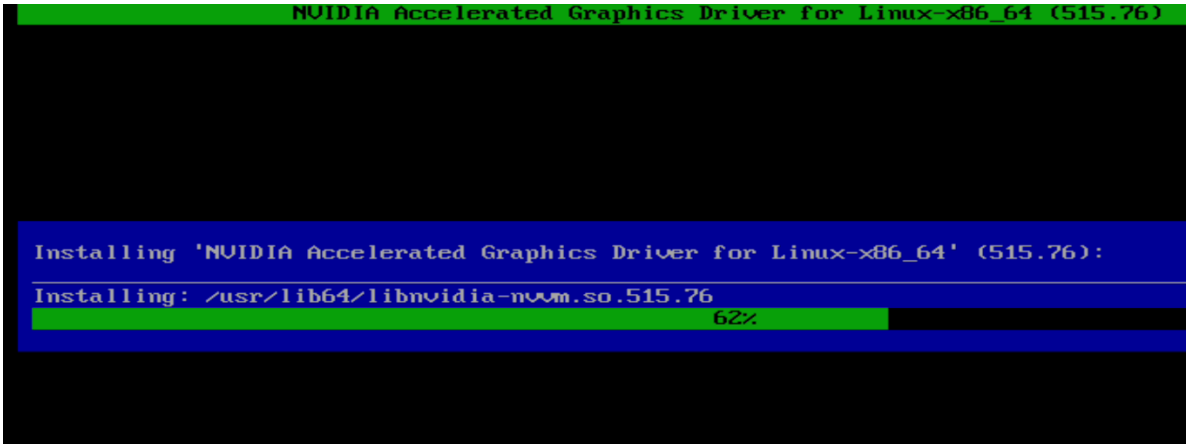
8. The driver will ask whether to install NVIDIA's 32-bit compatibility libraries.
   In this example, 'yes' was selected.



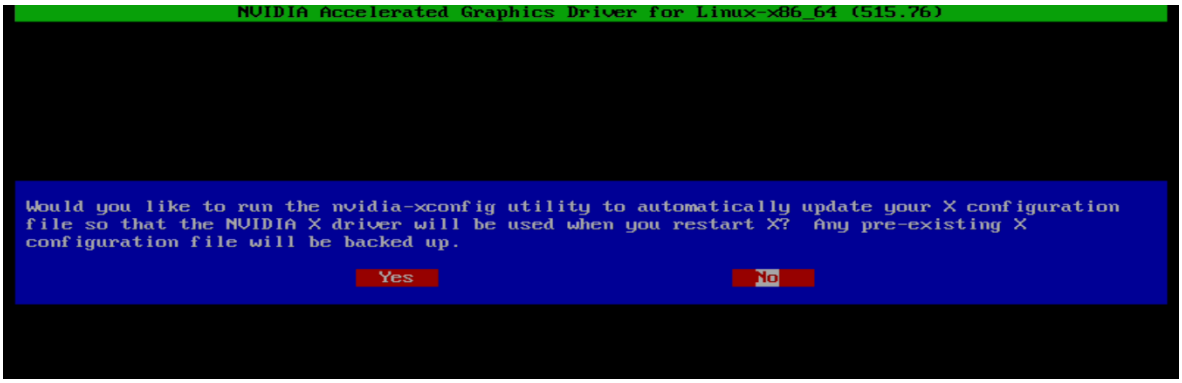
9. Select 'OK' on the following warning message.



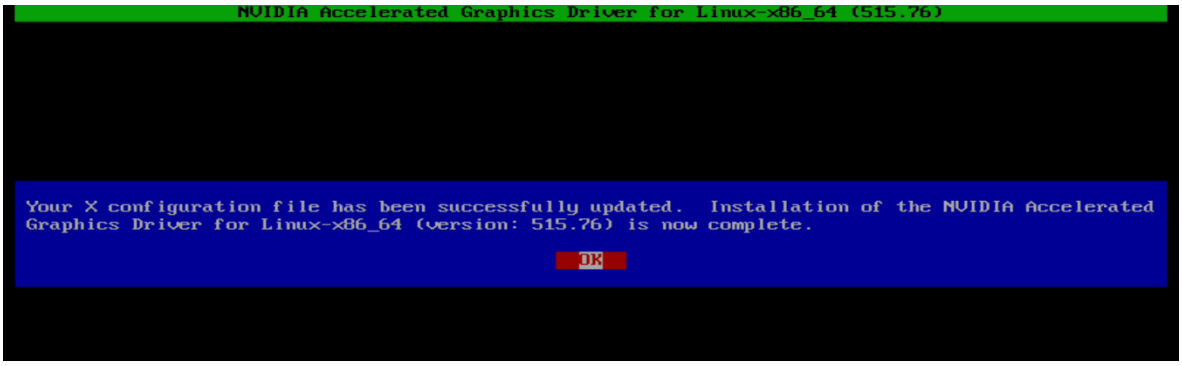
10. The driver should continue to install.



11. Select ‘Yes’ to update the x-configuration file.



12. Select ‘OK’ to acknowledge that the x-configuration file has successfully been updated.



13. Run the following command to verify the Nvidia driver has been installed and loaded properly.

    # nvidia-smi

```
[root@localhost Desktop]# nvidia-smi
Thu Nov  3 06:42:35 2022
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 515.76       Driver Version: 515.76       CUDA Version: 11.7     |
|-------------------------------+----------------------+----------------------+
| 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 T400 4GB     Off  | 00000000:27:00.0 Off |                  N/A |
| 32%   44C    P0     N/A /  31W |      0MiB /  4096MiB |      0%      Default |
|                               |                      |                  N/A |
+-------------------------------+----------------------+----------------------+

+-----------------------------------------------------------------------------+
| Processes:                                                                  |
|  GPU   GI   CI        PID   Type   Process name                  GPU Memory |
|        ID   ID                                                   Usage      |
|=============================================================================|
|  No running processes found                                                 |
+-----------------------------------------------------------------------------+
[root@localhost Desktop]# _
```

Revision History

Version	Date	Author	Changes/Updates
1.0	5/26/2023	Jason M.	Initial launch release.