Dual Boot Setup Guide

For Microsoft Windows and Linux

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Overview

Due to the ongoing popularity of Windows based operating systems, and the increasing interest in various versions of Linux operating systems, some users might find it useful to have a system that is able to boot two different operating systems on the same storage drive. The purpose of this whitepaper is to explain how to set up a ThinkStation or ThinkPad system with a dual operating system boot configuration.

There are two ways to do the dual-boot installation depending on which OS the user would like to install first. With either operating system first, the user will need to partition an empty disk to leave space for the other OS to be installed later.

Preparations before installing new OS:

1. Create Windows installation media
2. Linux installation media
3. **Back up important files.** Accidently deleting the wrong partition can result in the permanent deletion of stored data.

Section 1 – Dual Boot Starting with Windows – Creating Partitions

Section 1 and 2 will provide instructions on how to set up dual boot on a blank drive with a Windows operating system installed first. If Windows is already installed on the system, skip to Step 4 of this section.

For a more in-depth walkthrough on installing Windows, please see the Windows 10 & Windows 11 Installation whitepaper.

Step 1: In the Windows setup process, there is a step where the user selects which disk or disk partition to install the OS on. Select the unallocated space on the drive and click "New" and enter in the desired partition size. Once finished, click "Next".
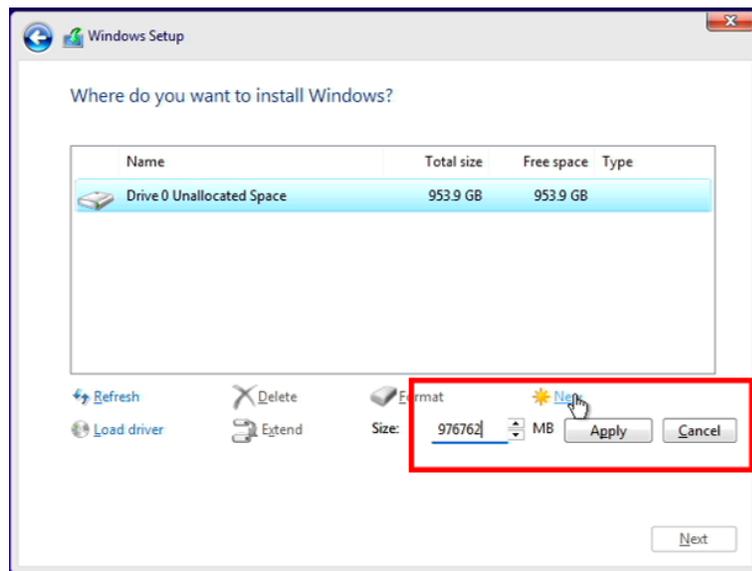
Step 2: Click "OK" on the pop-up.
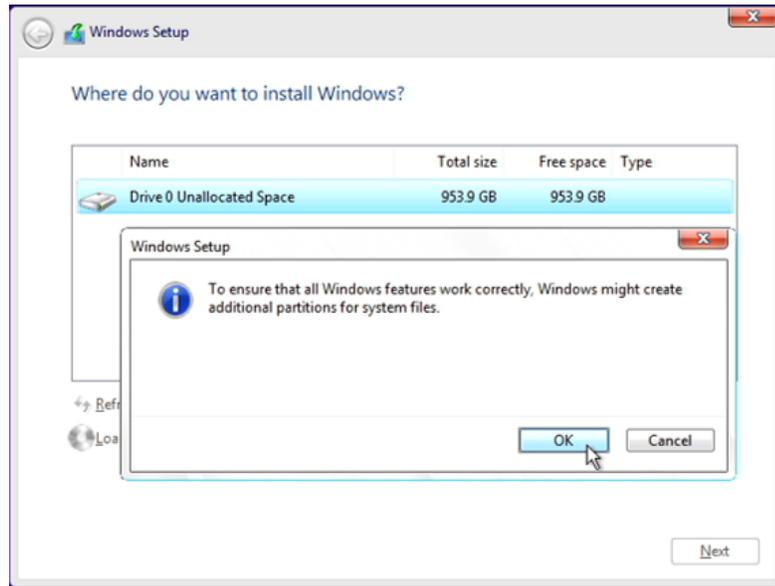
Step 3: Select the newly created Primary Partition, then click "Next" to continue with the Windows installation as normal. Once Windows is finished installing, the system can be shutdown for the Linux installation (See Section 2).
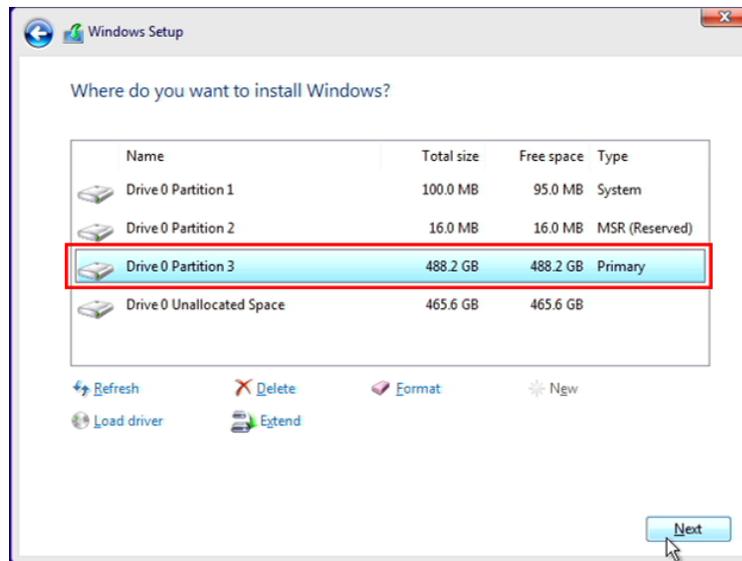
Step 4: Alternatively, if Windows is already installed on the system, right click on the start icon and select "Disk Management".

Step 5: The Disk Management utility enables the user to view and manage the disk drives.
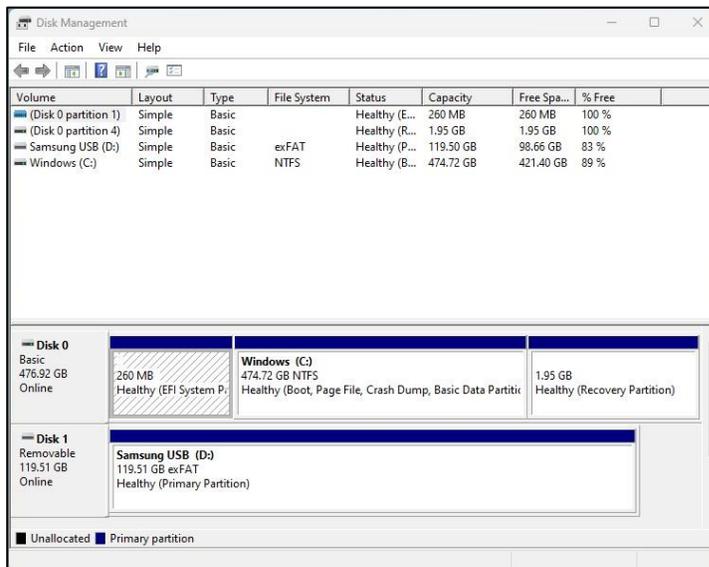
Step 6: Right click on volume C: and select "Shrink Volume". Do not edit the EFI or Recovery partitions. Editing the EFI partition may prevent Windows from being able to boot.
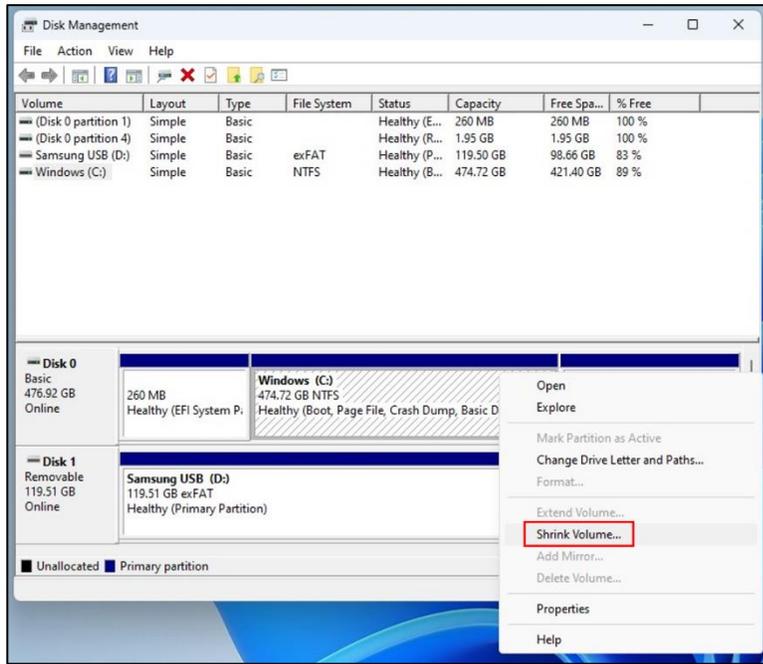
Step 7: Enter the amount of space to free for the second operating system in MB and hit "Shrink".
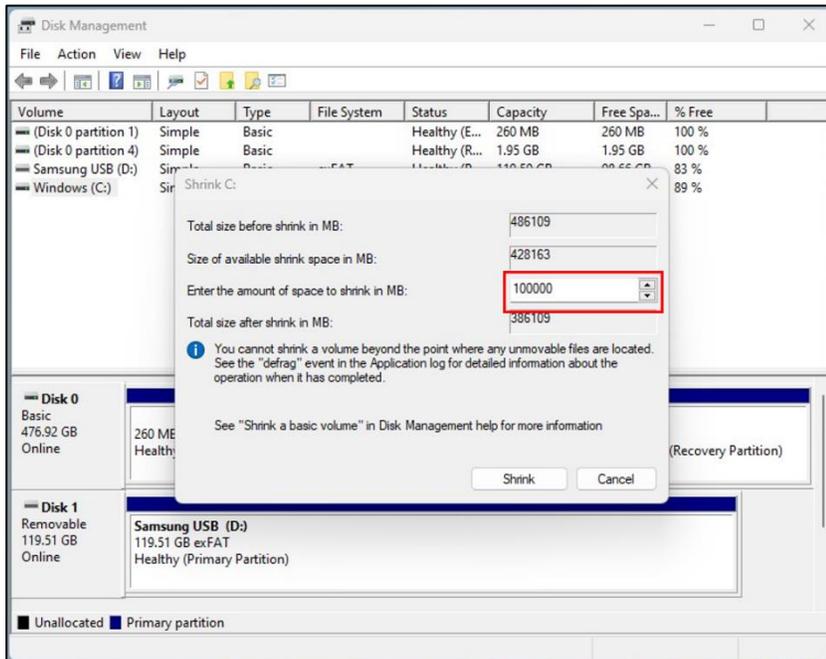
Step 8: Verify the newly created unallocated space once the shrinking is complete.
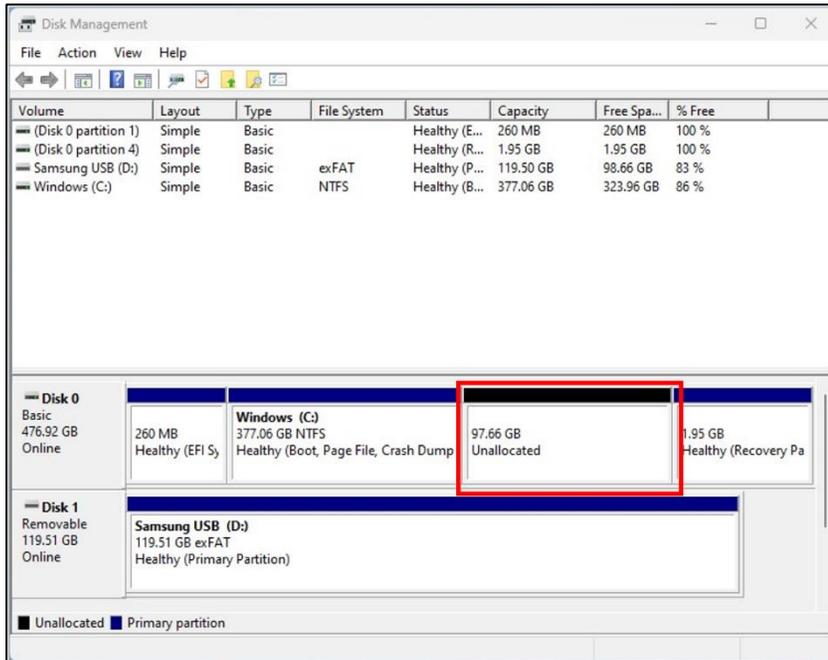
Step 9: Shutdown the system.

Section 2 – Linux Installation in Windows-created Partition

This section will use Red Hat Enterprise Linux 8.6 as an example. There are many other Linux distributions available online, though not all are officially supported for ThinkStation platforms. For more in-depth installation instructions, see the installation whitepapers for officially supported distros on ThinkStation. As of this writing, whitepapers for Red Hat, Fedora, Ubuntu, and Debian are available.

Step 1: Insert Linux boot key into the system, power the system on, and press F12 when the Lenovo splash screen appears to open the Boot Menu. Select the Linux bootable media from the list.
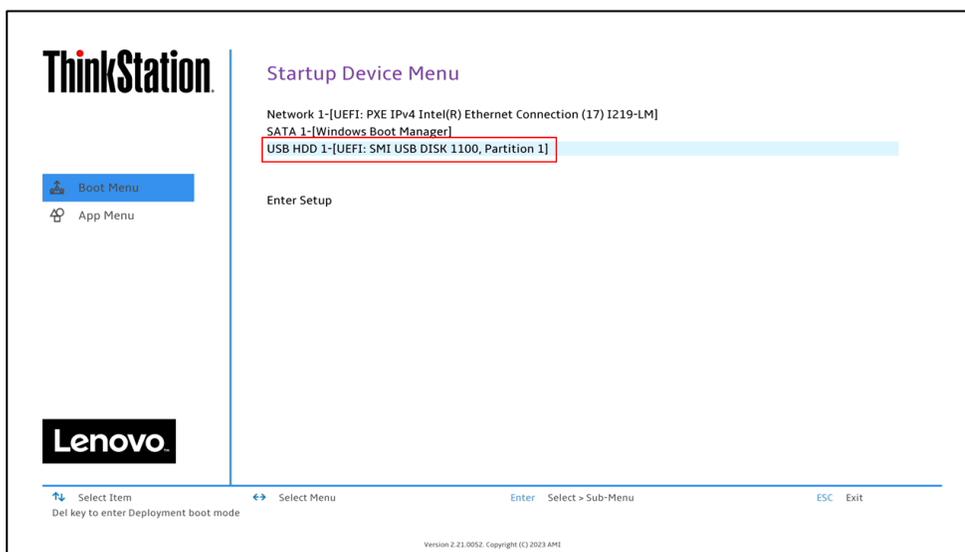
Step 2: Select "Install Red Hat Enterprise Linux" and press enter.
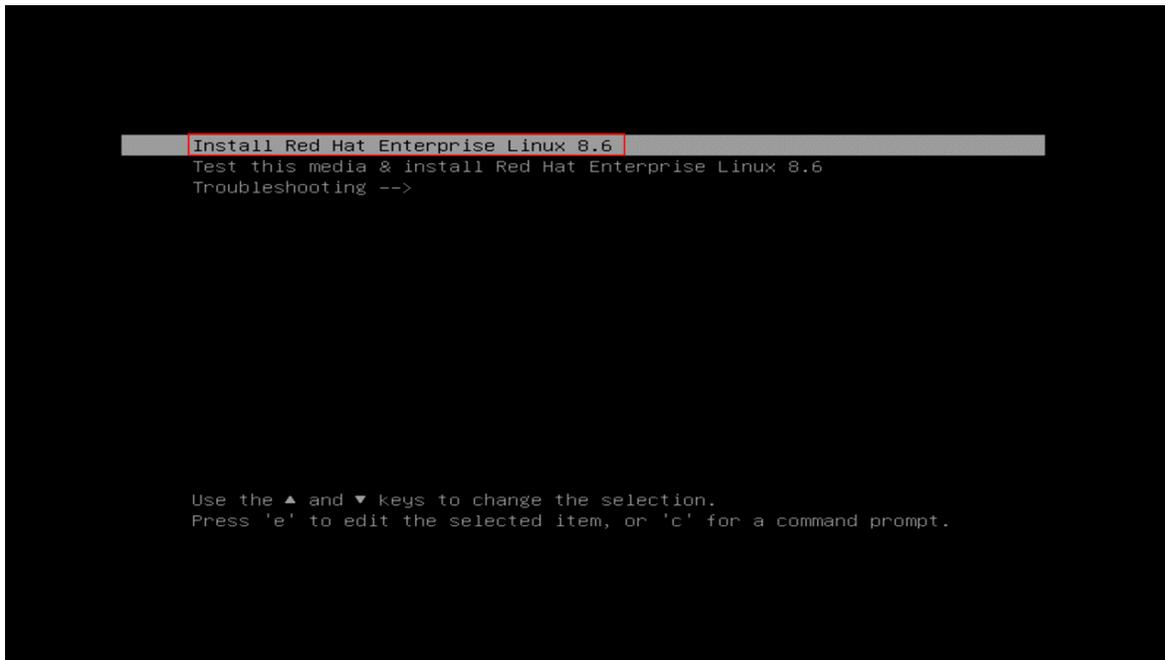
Step 3: Further in the installation process, select "Installation Destination".
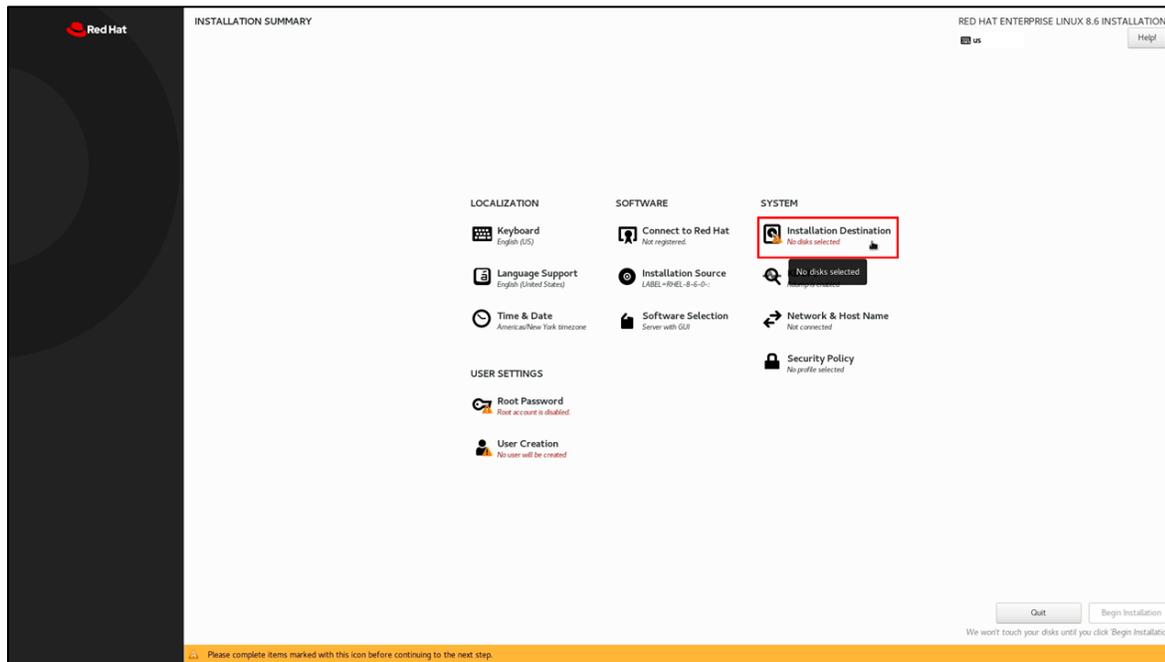
Step 5: Select the device on where to install the operating system and select "Custom" under Storage Configuration. Click "Done" to proceed. Some Linux distributions may have an option to install alongside Windows Boot Manager. If an option like this is present, select it and skip to Step 9.
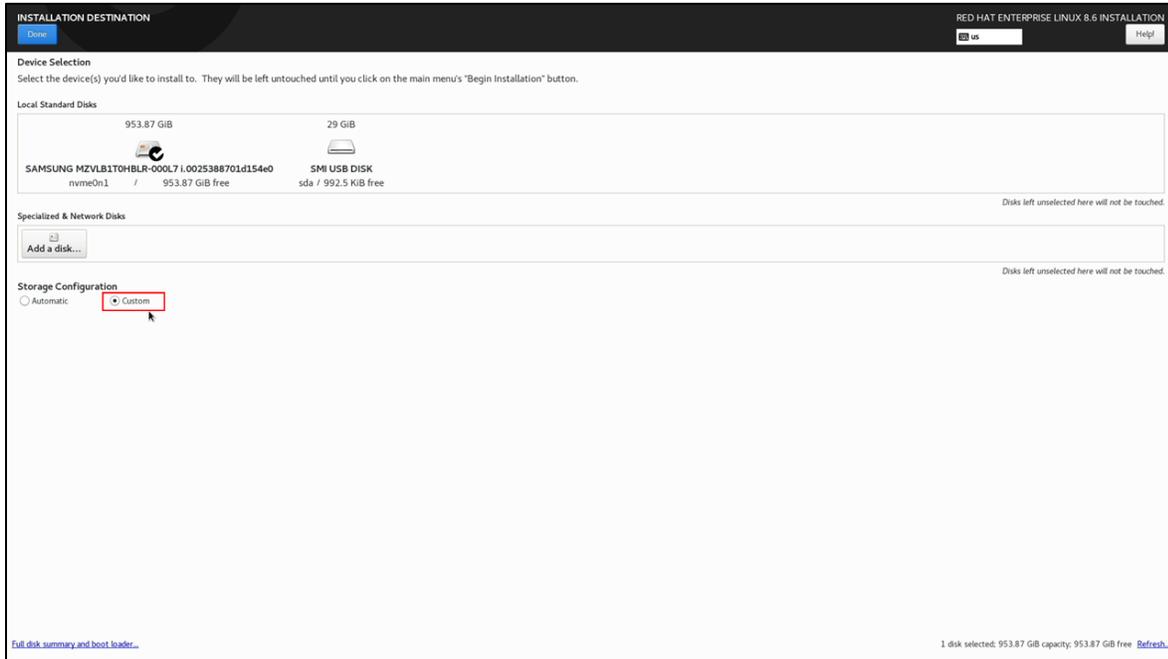
Step 6: Under Manual Partitioning section select "Click here to create them automatically". This action will use the free unallocated space on the drive and assign it for Linux. Existing partitions for Windows are under the "Unknown" collapsible and should not be edited.
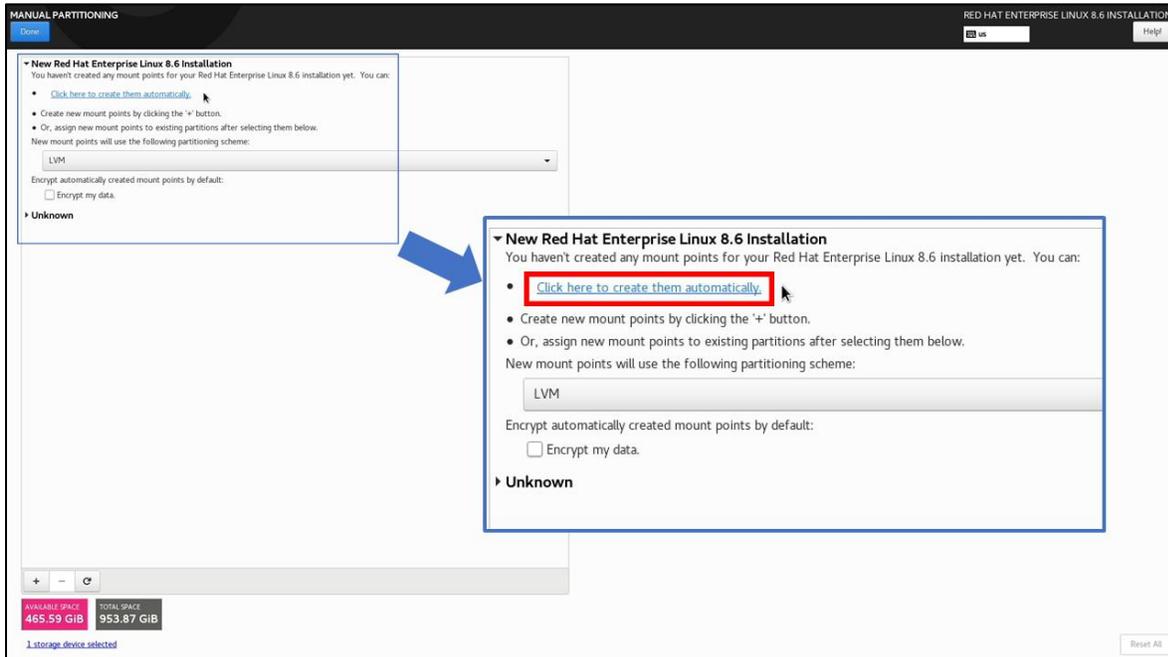
Step 7: You can view the automatically created disk partitions inside the new operating system. Click "Done" once done viewing.
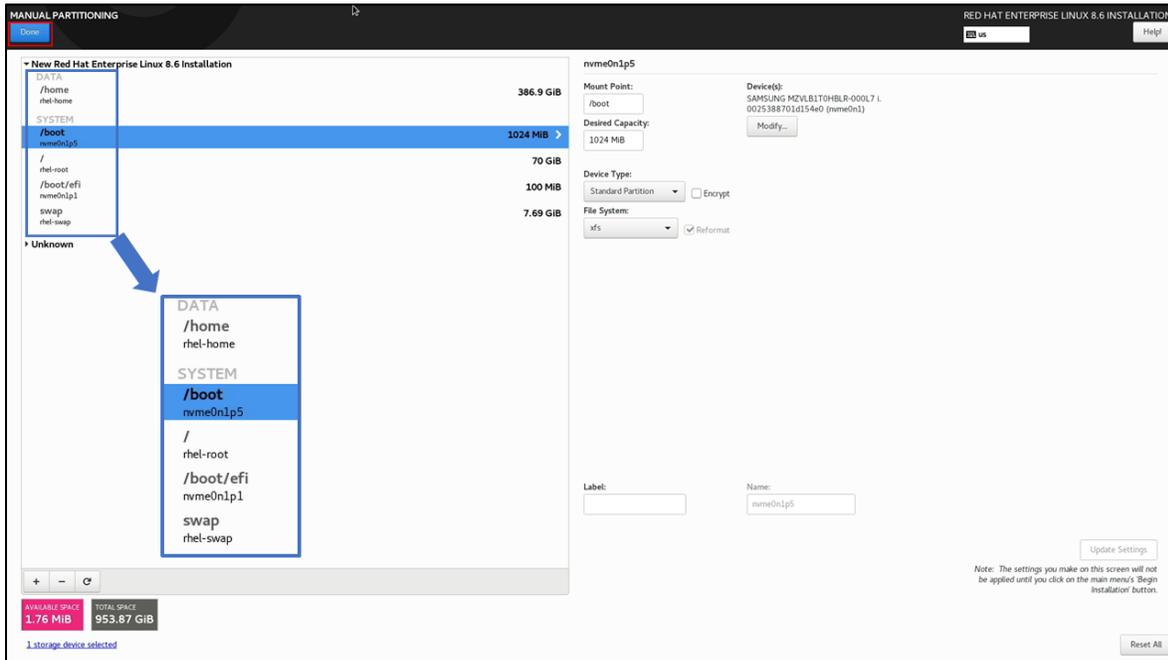
Step 8: Verify the summary of changes and select "Accept Changes".
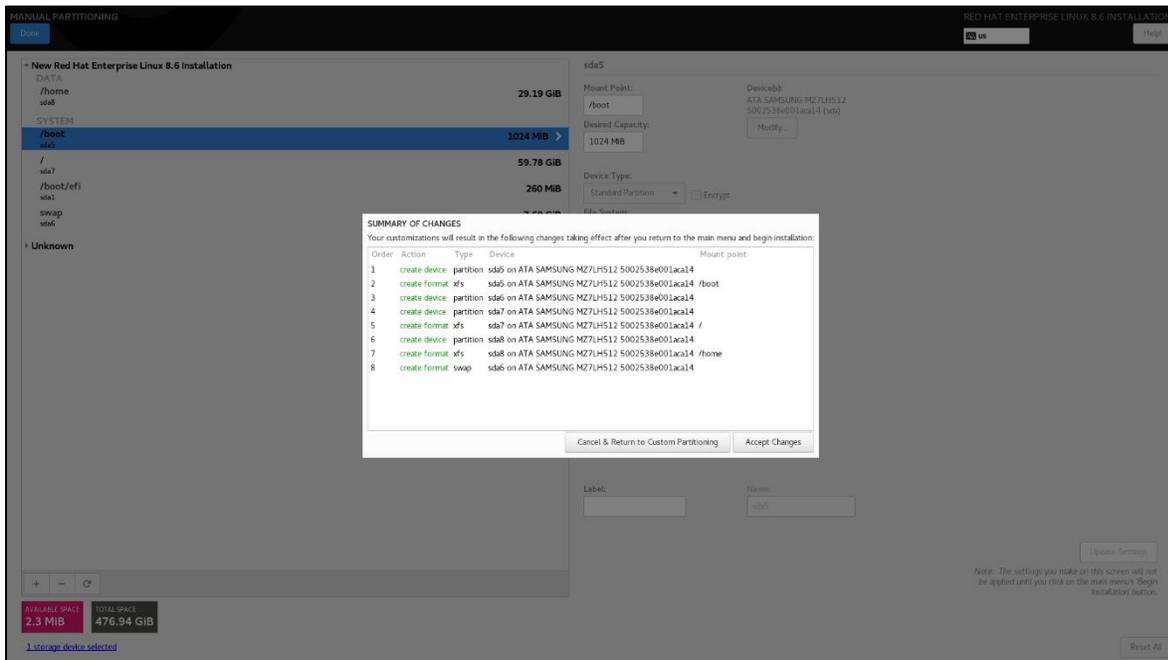
Step 9: Continue with the rest of the installation, following along with the proper whitepaper.
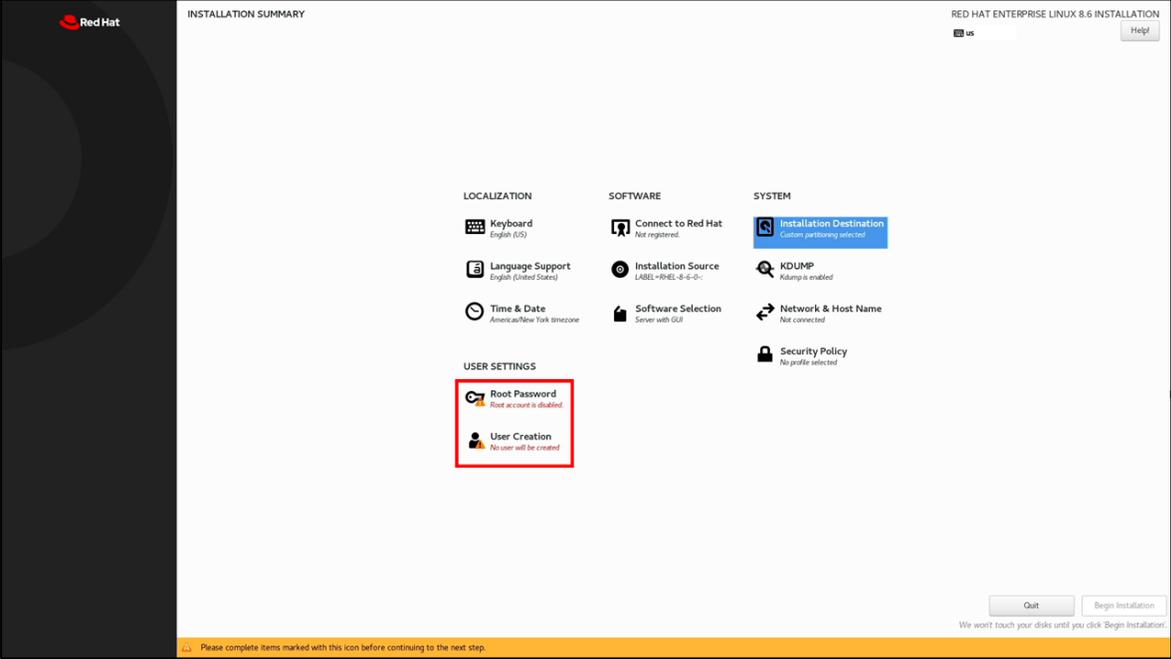
Step 10: Allow the OS to finish installing and restart the system. Skip to Section 4 for instructions on how to choose which OS to boot into on startup.
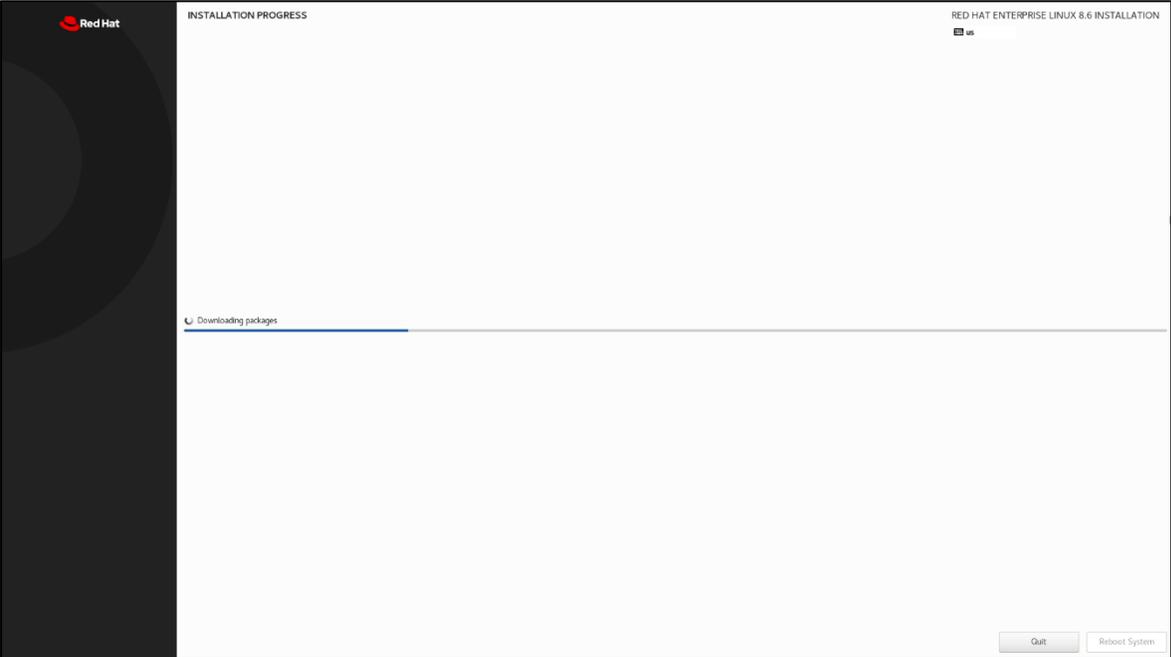
Section 3 – Dual Boot Starting with Linux – Creating Partitions

This section will provide instructions on how to set up dual boot on a blank drive with a Linux distro installed first. Ubuntu 22.04 will be used in this example.

For a more in-depth walkthrough on installing Linux on ThinkStation, please see the corresponding whitepaper for the distro of your choice. As of this writing, whitepapers for Red Hat, Fedora, Ubuntu, and Debian are available.

If Linux is already installed on the system, its partitions can be resized using the trial mode from USB stick. The partition cannot be shrunk from within the OS unlike Windows because Linux is currently "running" those partitions, so they cannot edited.

Step 1: Insert Linux boot key into the system, power the system on, and press F12 when the Lenovo splash screen appears to open the Boot Menu. Select the Linux bootable media from the list.
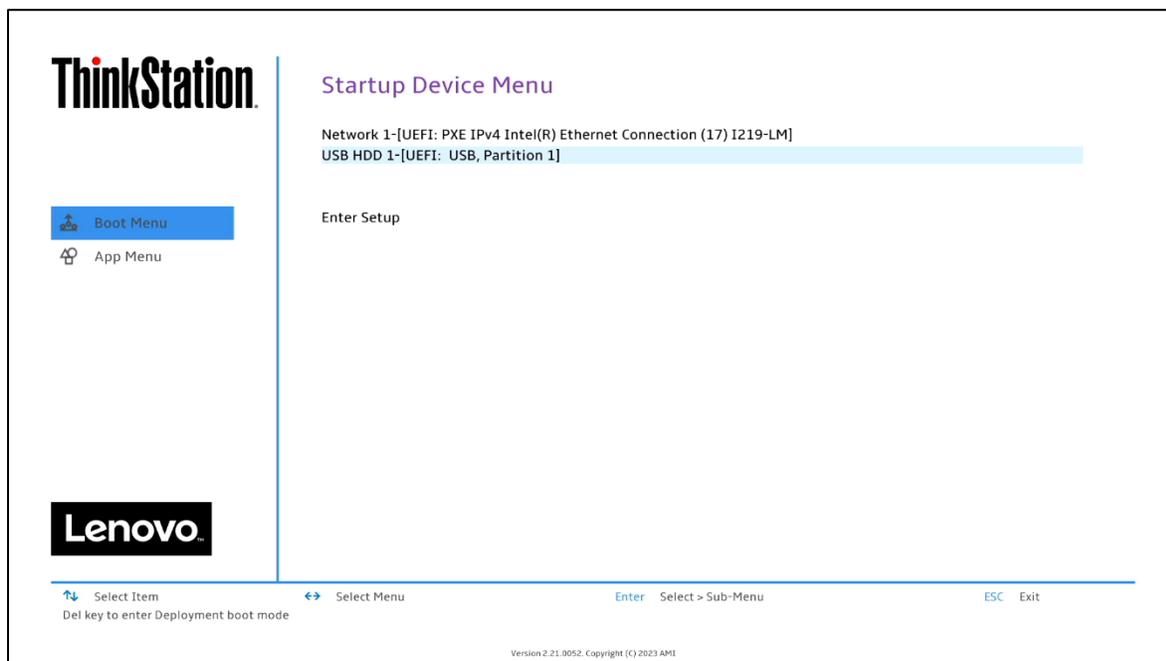
Step 2: Select "Try or Install Ubuntu" and press enter. Other Linux distros should have a similar option as this, but those that do not should have an option to immediately begin the install process.
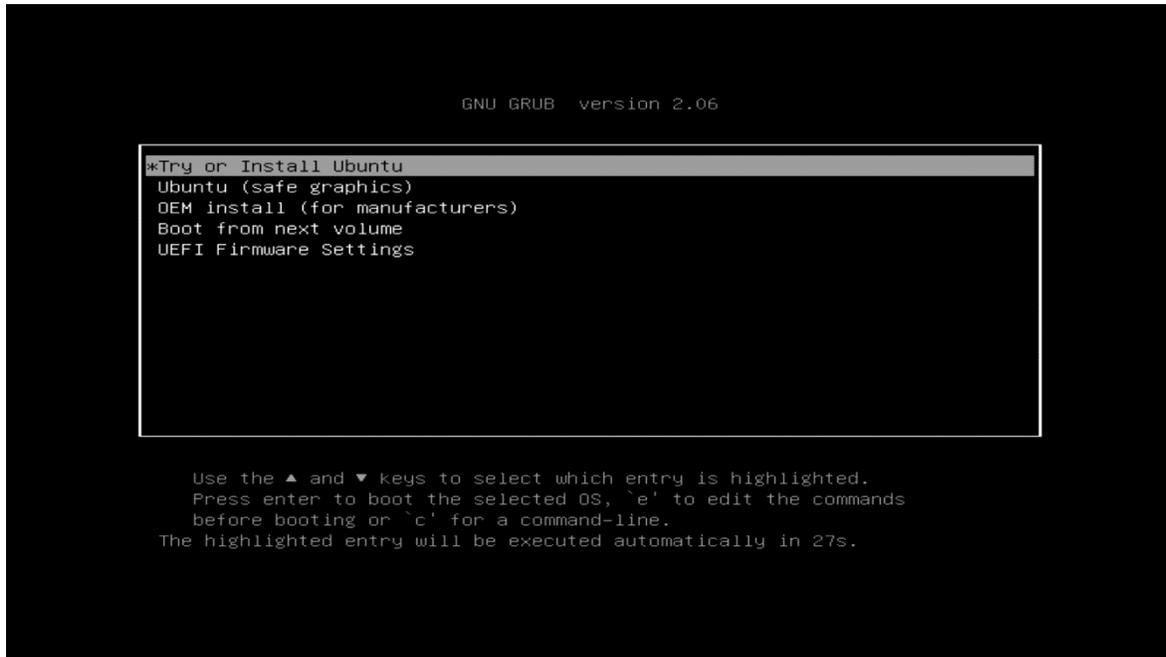
Step 3: The system will now begin to load a test version of the OS.

Step 4: Once loaded, the resolution and scaling of the OS may appear lower than expected due to a lack of proper graphics drivers, but this will not affect the installation process. From here there are a couple of options to choose from. The OS installation process can continue immediately by selecting "Install Ubuntu", or the OS can be trialed first with the installation coming later.
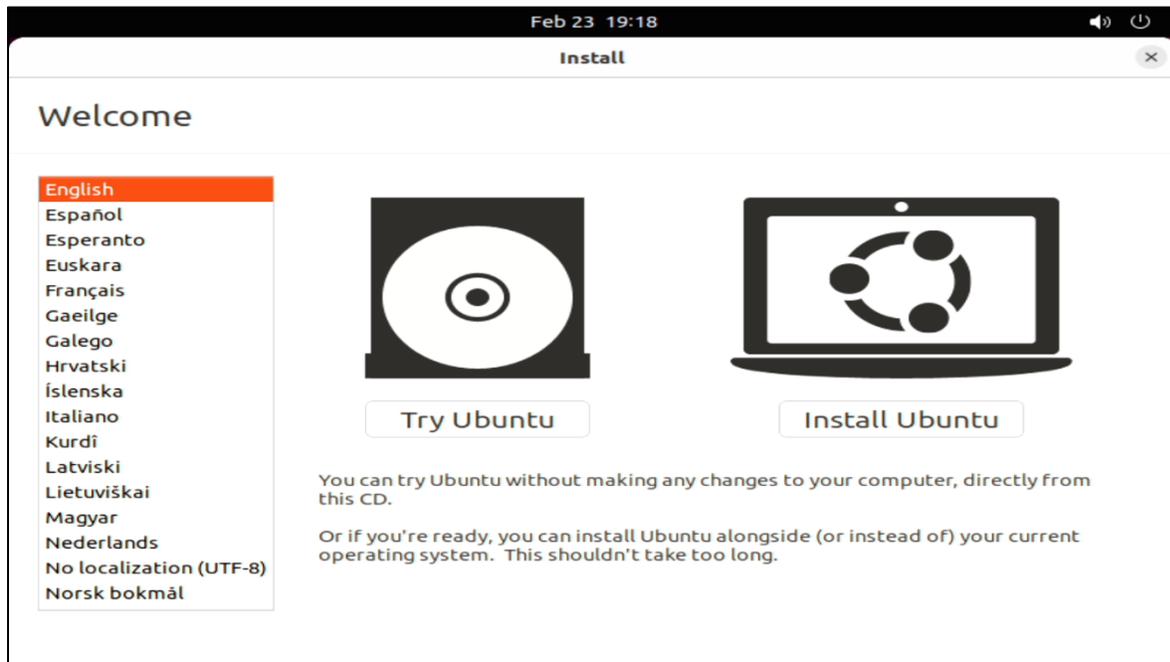
Step 5: Once the installation is continued, once at the "Installation Type" screen, select "Something else". For more in-depth instructions on the installation, see the Linux Installation whitepapers.
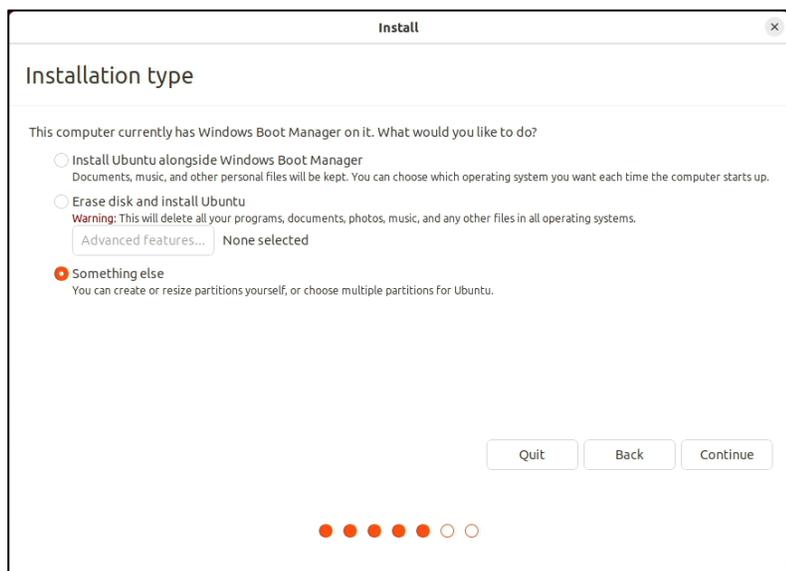
Step 6: Double-click on the Free Space of the storage drive to create a new partition. This can also be done by clicking the "+" button.
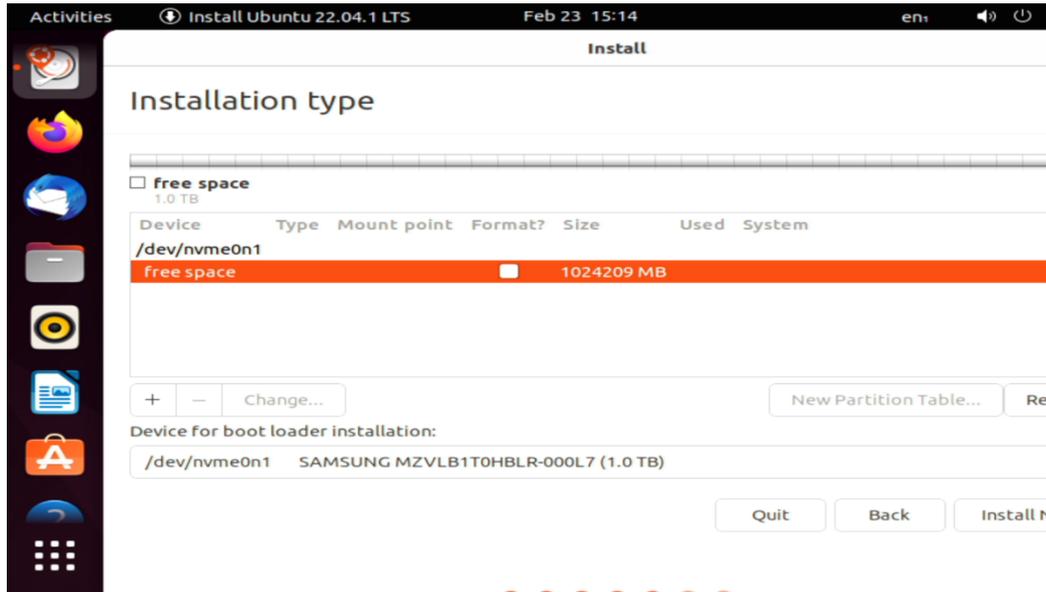
Step 7: Fill out the fields as shown to create the /boot partition by selecting Ext4 file system. The partition size needed may vary depending on hardware or user preference.
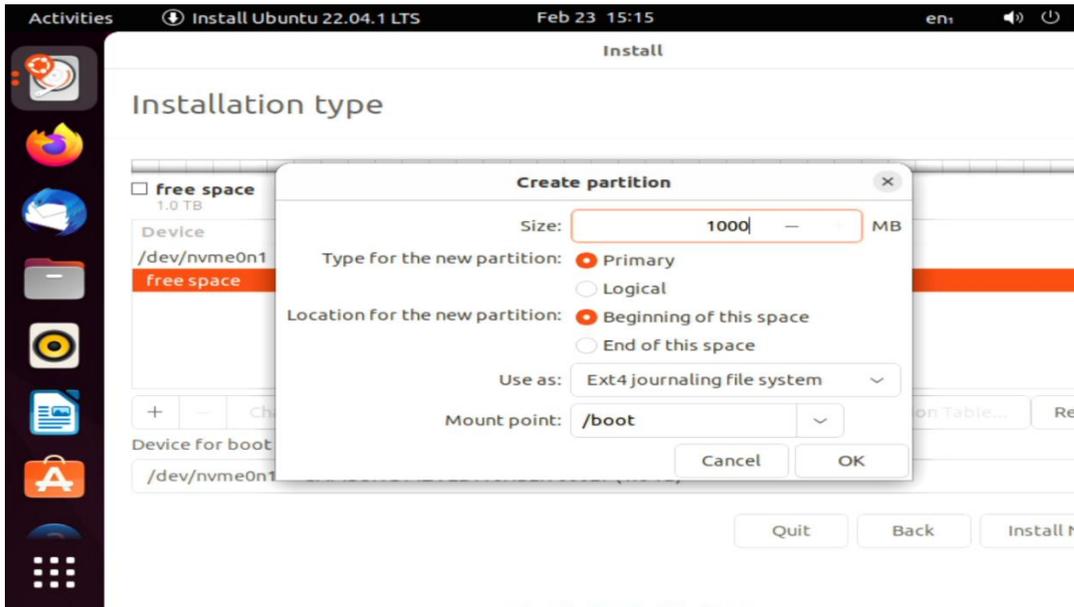
Step 8: Create another partition for "swap area". Make sure to change the partition type to "Logical". The partition size needed may vary depending on hardware or user preference. It should be set higher if the system will use hibernation.
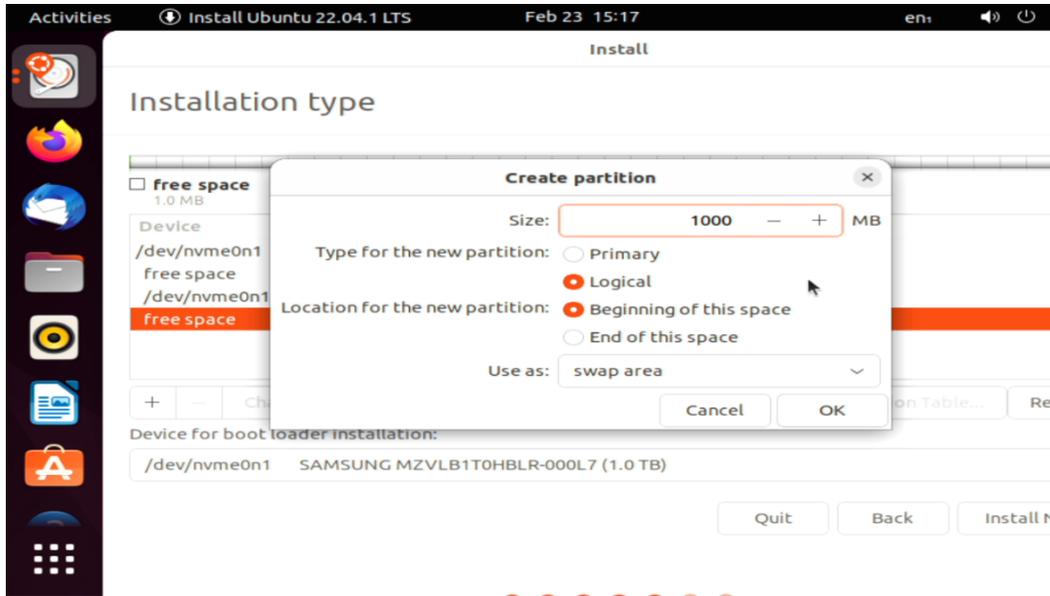
Step 9: Create another partition for root "/". This partition will contain most OS files and user storage. A separate "\home" partition can be created to independently hold user files separate from system files, though this is optional. Generally this partition should be at least 10-20 GB, depending on hardware or user preference.
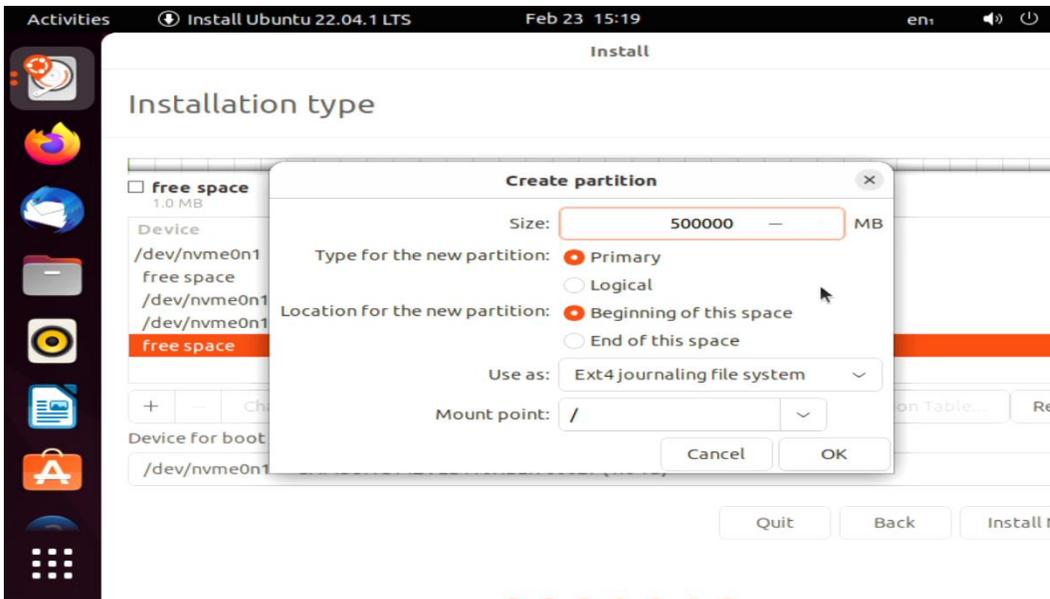
Step 10: Lastly, create an EFI partition. This will be used to load the OS. The partition size needed may vary depending on hardware or user preference.
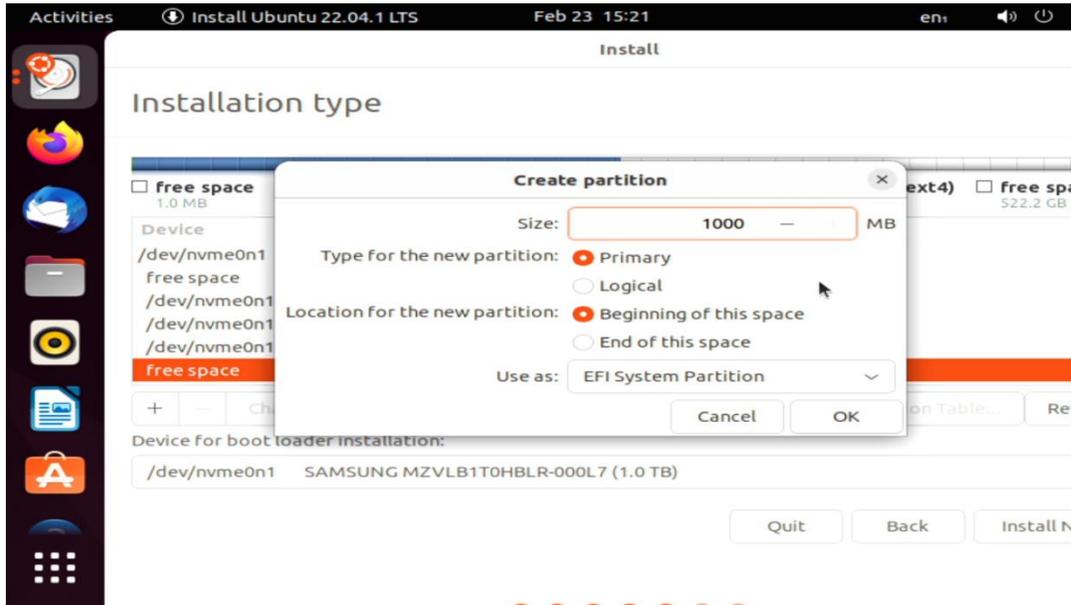
Step 11: Click "Install Now" and review all the changes made, then click "Continue".
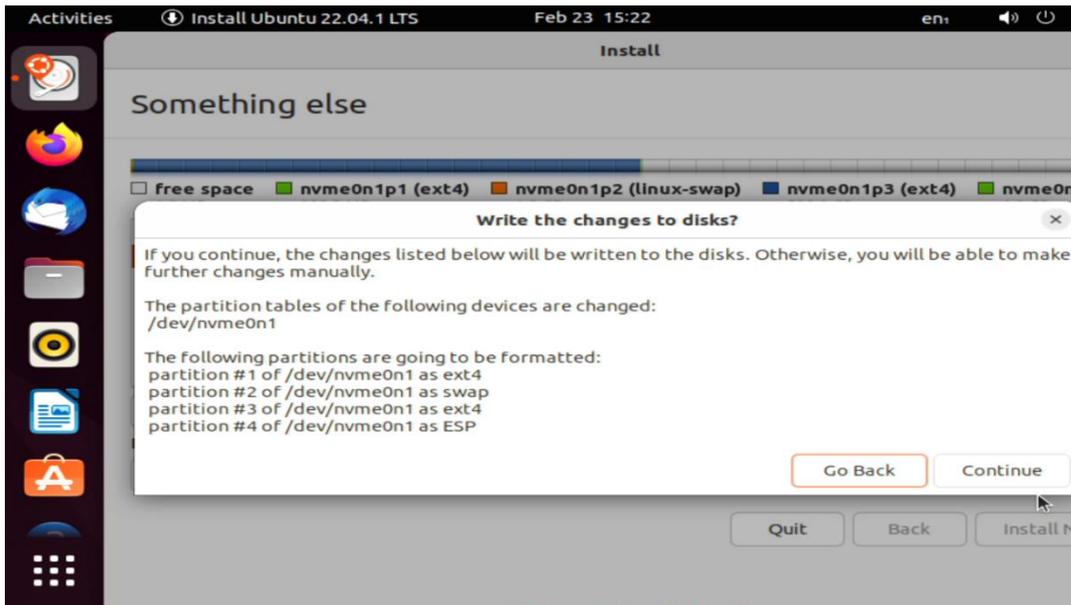
Step 12: Complete the rest of the installation process, following guidance from the Linux Installation whitepapers. Once finished, restart the system and begin the Windows installation. See the Windows Installation whitepaper for more details.
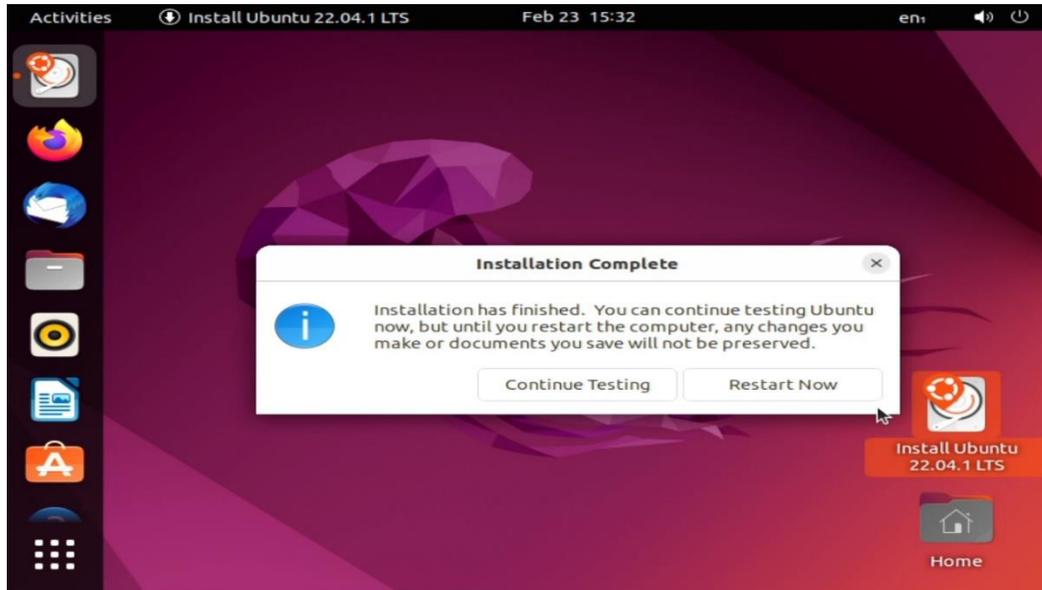
Step 13: Arriving at the step to select where to install Windows, select the unallocated space leftover after the Linux install process.
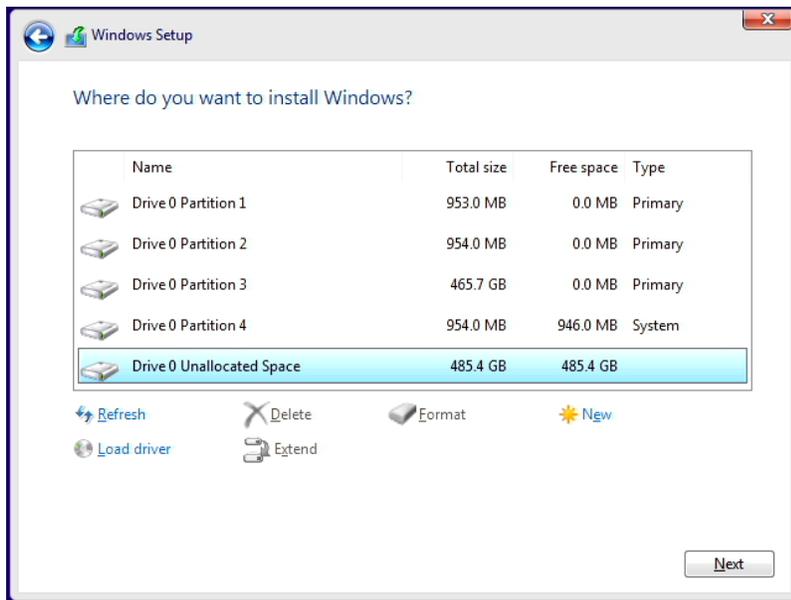
Section 4 – Switching Between Operating Systems

There are a couple of methods to choose which OS to boot into during startup. First is using the Linux GRUB menu, which is displayed before the system finished booting into the Linux partition.

Figure 1 – Linux GRUB Menu
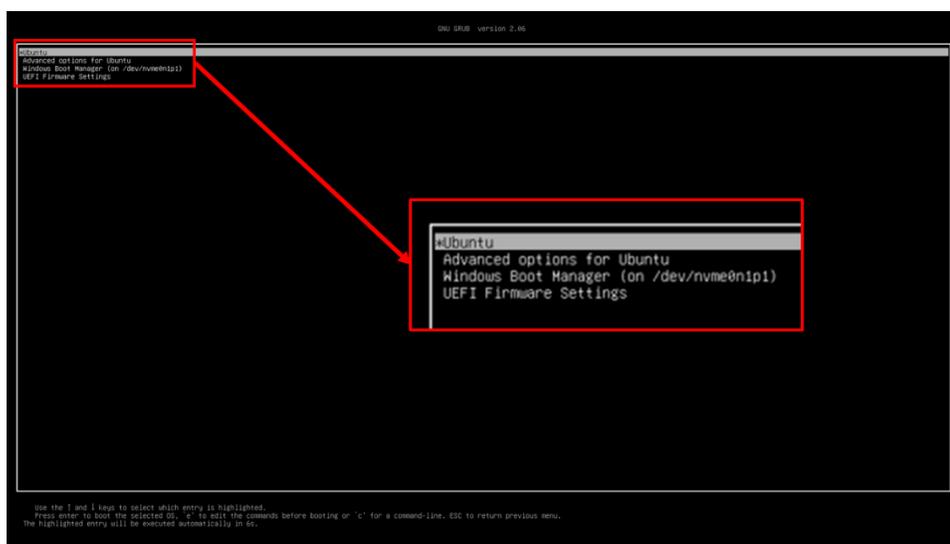
GRUB Menu Option	Description
Ubuntu	Loads into the Ubuntu operating system
Advanced options for Ubuntu	Shows list of additional Linux boot options
Windows Boot Manager (on …)	Loads into the Windows operating system
UEFI Firmware Settings	Loads into BIOS

The GRUB will load the highlighted OS if no selection is made in the time period indicated at the bottom of the screen. The GRUB menu may not display the first time after Linux is installed any may require a system shutdown to appear properly.

The second method is selecting from the system boot menu which is accessed by pressing the function F12 key at the "Lenovo" splash screen. From there the user can select the appropriate operating system (*See Figure 1*). This is similar in function as the GRUB menu.
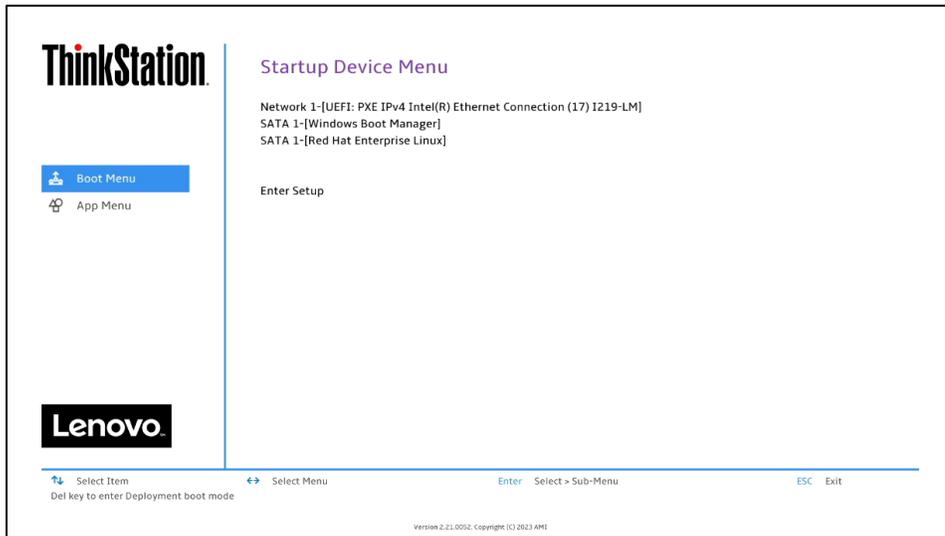
If one operating system will be primarily used over the other, it can be given priority in the system boot order to always boot on startup. This can be done by pressing the F1 key at the "Lenovo" splash screen and navigating to the "Startup" section and selecting "Priority Boot Order" (*See Figure 1).* Use the "+" and "-" keys to change the order priority, putting the Linux partition as the highest option. Press "F10" to save the changes and the system will restart.

Note: Some older platforms do not separate bootable partitions within the same drive and thus cannot be reordered in BIOS (*See Figure 3*). In this case, the latest operating system installed will be higher in priority within the drive. So, to access the GRUB menu, Linux must be installed after Windows. Either operating system can be selected manually through the F12 boot menu like normal.

Figure 3 – Priority Boot Order by Drive
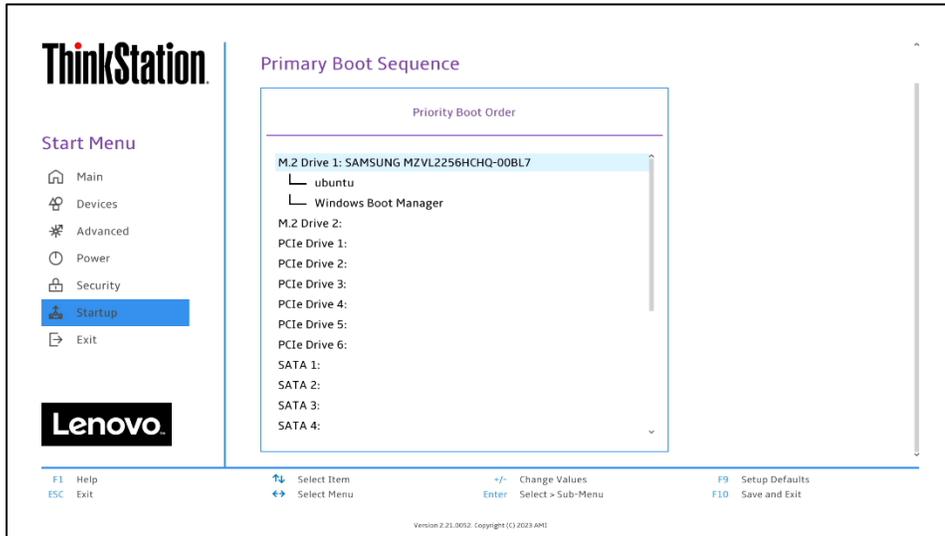
If Linux is selected as the primary boot option, every time the system boots it will load the Linux GRUB menu and the user will be able to select which OS they wish to load, or press nothing and Linux will automatically load.

Revision History

Version	Date	Author	Changes/Updates
1.0	01/15/2020	SP	Initial launch release
1.1	5/4/2023	CC	Updated information