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.** <u>**Back up important files.**</u> 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 <u>Step 4</u> of this section.

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

<u>Step 1</u>: 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".

Name		Total size	Free space	Туре
Drive 0 Una	llocated Space	953.9 GB	953.9 GB	
€ <u>9 R</u> efresh	Delete	✓ <u>F</u> ermat	*Neff	

Step 2: Click "OK" on the pop-up.

🕞 🔏 Wind	dows Setup					— X
When	e do you w	ant to install Windo	ows?			
	Name		Total size	Free space	Туре	
	Drive 0 Unal	ocated Space	953.9 GB	953.9 GB		
	Windows Se	tup			×	J'
∜∌ <u>R</u> efr	0	To ensure that all Windov additional partitions for s	vs features work correct ystem files.	ly, Windows m	ight create	
() <u>L</u> oa				ок	Cancel	
					Ne	t

<u>Step 3</u>: 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).

Name		Total size	Free space	Туре
Orive 0 Part	ition 1	100.0 MB	95.0 MB	System
Orive 0 Part	ition 2	16.0 MB	16.0 MB	MSR (Reserved
Drive 0 Part	ition 3	488.2 GB	488.2 GB	Primary
Irive 0 Una	llocated Space	465.6 GB	465.6 GB	
<u>R</u> efresh	X Delete	Format	∦ N <u>e</u> w	
🕑 Load driver	Extend			

<u>Step 4</u>: Alternatively, if Windows is already installed on the system, right click on the start icon and select "Disk Management".



<u>Step 5</u>: The Disk Management utility enables the user to view and manage the disk drives.

	Layout	Туре	File System	Status	Capacity	Free Spa	% Free
(Disk 0 partition (Disk 0 partition Samsung USB (I Windows (C:)	1) Simple 4) Simple 5) Simple Simple	Basic Basic Basic Basic	exFAT NTFS	Healthy (E Healthy (R Healthy (P Healthy (B	260 MB 1.95 GB 119.50 GB 474.72 GB	260 MB 1.95 GB 98.66 GB 421.40 GB	100 % 100 % 83 % 89 %
- Disk 0 Basic	260 MB	wi 474 stem Pr He	ndows (C:) 1.72 GB NTFS althy (Boot, Page	File, Crash Dum	p, Basic Data Parti	1.95 GB Healthy	r (Recovery Partition)
476.92 GB Online	Healthy (EFI Sy						

<u>Step 6</u>: 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.

File Action	View Help								
	🛛 🖬 🖛 🗙 🛛	2 🔒 🚂 🛛	2						
Volume (Disk 0 partiti (Disk 0 partiti Samsung USE	on 1) Simple on 4) Simple 3 (D:) Simple	Type Basic Basic Basic	exFAT	Status Healthy (E Healthy (R Healthy (P	Capacity 260 MB 1.95 GB 119.50 GB	Free Spa 260 MB 1.95 GB 98.66 GB	% Free 100 % 100 % 83 %		
Disk 0		Wir	ndows (C:)		///////////////////////////////////////	Contra			
Disk 0 Basic 476.92 GB Online	260 MB Healthy (EFI Sys	stem P: Hea	n dows (C:) .72 GB NTFS slithy (Boot, Page	File, Crash Dum	ip, Basic D	Open Explore Mark Partition	n as Active		
Disk 0 Basic 476.92 GB Online Disk 1 Removable 119.51 GB Online	260 MB Healthy (EFI Sys Samsung USB 119.51 GB exFA Healthy (Primar	(D:) T y Partition)	ndows (C:) .72 GB NTFS lithy (Boot, Page	File, Crash Dum	p, Basic D	Open Explore Mark Partition Change Drive Format Extend Volum	n as Active • Letter and P	Paths	
Disk 0 Basic 476.92 GB Online Disk 1 Removable 119.51 GB Online Unallocated	260 MB Healthy (EFI Sys Samsung USB 119.51 GB exFA Healthy (Primar Primary partition	(D:) Ty Partition)	ndows (C:) .72 GB NTS althy (Boot, Page	File, Crash Dum	p, Basic D	Open Explore Mark Partition Change Drive Format Extend Volum Shrink Volum Add Mirror Delete Volum	n as Active Letter and P I.e e	Paths	
Disk 0 Basic 476.92 GB Online Disk 1 Removable 119.51 GB Online Unallocated	260 MB Healthy (EFI Sys Samsung USB 119.51 GB ex/FA Healthy (Primar Primary partition	(D:) T py Partition)	ndows (C:) .72 GB NTFS lithy (Boot, Page	File, Crash Dum	p, Basic D	Open Explore Mark Partition Change Drive Format Extend Volum Shrink Volum Add Mirror Delete Volum Properties	n as Active : Letter and P :e e	Paths	

<u>Step 7</u>: Enter the amount of space to free for the second operating system in MB and hit "Shrink".

File Action	ement View	Help						_		×
🔶 🏟 📰 🖡	?	🗩 🗹 🖪								
Volume		Layout	Туре	File System	Status	Capacity	Free Spa	% Free		
 (Disk 0 partitic (Disk 0 partitic Samsung USB Windows (C:) 	on 1) on 4) (D:)	Simple Simple Sirr Shrink C Total size Size of a Enter the Total size Ope	Basic Basic before shrini vailable shrini amount of sp e after shrink i cannot shrin the "defrag" ration when it	k in MB: k space in MB: pace to shrink in M in MB: k a volume beyon event in the Appli t has completed.	Healthy (E Healthy (R Healthy R B: B: d the point where cation log for deta	260 MB 1.95 GB 486109 428163 100000 386109 any unmovable f iled information a	260 MB 1.95 GB 260 C C X iles are located. ibout the	100 % 100 % 83 % 89 %		
Basic 476.92 GB Online	260 Hea	ME See alth:	"Shrink a ba	asic volume" in Dis	k Management he	elp for more infom Shrink	nation Cancel	(Recovery P	artition)	
— Disk 1 Removable 119.51 GB Online	San 119 Hea	nsung USB (I .51 GB exFAT althy (Primary	D:) Partition)							
Unallocated	Prim	ary partition							3	

<u>Step 8</u>: Verify the newly created unallocated space once the shrinking is complete.

	Lavout	Type	File System	Status	Canacity	Free Spa	% Free
(Disk 0 partiti	on 1) Simple	Basic	The System	Healthy (E	260 MB	260 MB	100 %
(Disk 0 partiti	on 4) Simple	Basic		Healthy (R	1.95 GB	1.95 GB	100 %
Samsung USE	B (D:) Simple	Basic	exFAT	Healthy (P	119.50 GB	98.66 GB	83 %
Windows (C:)	Simple	Basic	NTFS	Healthy (B	377.06 GB	323.96 GB	86 %
Disk 0 Basic 176.92 GB Dnline	260 MB Healthy (EFI Sy	Windows 377.06 GB Healthy (B	(C:) NTFS oot, Page File, Cr.	ash Dump 97. Un	66 GB allocated		1.95 GB Healthy (Recovery Pa

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.

<u>Step 1</u>: 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.

ThinkStation.	Startup Device Me Network 1-[UEFI: PXE IPv4 In SATA 1-[Windows Boot Manay USB HDD 1-[UEFI: SMI USB DI	2 N U tel(R) Ethernet Connection (17) I219-LM] ger] SK 1100, Partition 1]		
<u>δ</u> Boot Menu & App Menu	Enter Setup			
Lenovo.	 ♦ Select Menu 	Enter Select > Sub-Menu	ESC Exit	
	Ve	rsion 2.21.0052. Copyright (C) 2023 AMI		

<u>Step 2</u>: Select "Install Red Hat Enterprise Linux" and press enter.



Step 3: Further in the installation process, select "Installation Destination".

🦰 Red Hat	INSTALLATION SUMMARY				RED HAT ENTERPRISE LINUX	X 8.6 INSTALLATION
		LOCALIZATION	SOFTWARE	SYSTEM		
		English (US)	Connect to Red Hat Not registered.	Installation Destination No disks selected		
		English (United States)	Installation Source LABEL=RHEL-8-6-0-:	RNo disks selected		
		O Time & Date Americas/New York timezone	Software Selection Server with GUI	Network & Host Name		
		USER SETTINGS		Security Policy No profile selected		
		Root Password Root account is disabled.				
		User Creation				
					Quit	Begin Installation
	Δ . Please complete items marked with this icon before continuing to the ${\rm n}$	ext step.			We won't touch your disks until	you click 'Begin Installation'.

<u>Step 5</u>: 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.

INSTALLATION DESTINATION	RED HAT ENTERPRISE LINUX 8.6 INSTALLATION
Device Selection	
Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button.	
Local Standard Disks	
953.87 GIB 29 GIB	
SAMSUNG MZVLB1T0HBLR-000L7 i.0025388701d154e0 SMI USB DISK	
nvme0n1 / 953.87 GiB free sda / 992.5 KiB free	
Specialized & Network Disks	Disks left unselected here will not be touched.
ei Add a disk	
Storage Configuration Automatic Control Contr	Doks left unselected here will not be touched.
Full disk summary and boot loader	1 disk selected; 953.87 GiB capacity; 953.87 GiB free Refresh

<u>Step 6</u>: 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.

MANUAL PARTITIONING Done	RED HAT ENTERPRISE LINUX 8.6 INSTALLATIC
Verw Red Hat Enterprise Linux 8.6 Installation Vou haent created any mouse points for your Red Hat Enterprise Linux 8.6 installation yet. You care (ick have to created methan automatically,) (creater own once priorits by dividing larve 'batten.) (creater own once priorits by dividing larve' batten. (creater own priorits will use the following partitioning scheme: (creater own priorits by dividing larve' batten. (creater own priorits batten priorits by dividing larve' batten. (creater own priorits by dividing larve' batten. (creater own priorits batten priorits by dividing larve' batten. (creater own priorits batten priorits by dividing larve' batten. (creater own priorits batten priorits by dividing larve' batten. (creater own priorits batten priorits bat	• New Red Hat Enterprise Linux 8.6 Installation You haven't created any mount points for your Red Hat Enterprise Linux 8.6 installation yet. You can: • <u>Click here to create them automatically</u> • Create new mount points by clicking the '+' button. • Or, assign new mount points to existing partitions after selecting them below. New mount points will use the following partitioning scheme: LVM
+ - 0	Encrypt automatically created mount points by default: Encrypt my data. Unknown
ANALARI STATE A65.59 GIB 153.87 GiB 1storge dwice anilated	Rest Al

<u>Step 7</u>: You can view the automatically created disk partitions inside the new operating system. Click "Done" once done viewing.

MANUAL PARTITIONIN	G	¢			RED HAT ENTERPRISE LINUX 8.6 INSTALLATION
▼ New Red Hat Ente	rprise Linux 8.6 Installation		nvme0n1p5		
DATA /home rhel-home		386.9 GIB	Mount Point: /boot	Device(s): SAMSUNG MZVLB1T0HBLR-000L7 I.	
SYSTEM /boot myme0n1p5		1024 MiB >	Desired Capacity: 1024 MiB	Modify	
1		70 GiB			
/boot/efi		100 MiB	Standard Partition Encrypt		
swap		7.69 GIB	File System:		
rhel-swap			xfs 👻 😪 Reformat		
- Unknown	DATA /home rhel-home SYSTEM /boot nwme0nlp5 / rhel-root /boot/efi nwme0nlp1 swap rhel-swap		Labot	Name: remetht.p5	Update Settings
+ - C					Note: The settings you make on this screen will not be applied until you click on the main menu's 'Begin Installation' button.
AVAILABLE SPACE 1.76 MiB 953 1 storage device selecte	a space 3.87 GiB ख				Reset All

Step 8: Verify the summary of changes and select "Accept Changes".

MANUAL PARTITIONING Done				RED HAT ENTERPRISE LINUX 8.6 INSTALLATION
- New Red Hat Enterprise Linux 8.6 Installation ΟΑΤΑ /home sole	29.19 GIB	sda5 Mount Point: /boot	Device(b): ATA SAMSUNG M27LH512 50025386001ac14 (std)	
/Soct //Soct / with / / Soct / With /	2024 MB 39.78 GB 250 MB SUMMARY OF CHANGES Your customizations will reach in the following houses to Order Action Type Devic 1 create device partition side on ATA SAMSUM 2 create device partition side on ATA SAMSUM 3 create device partition side on ATA SAMSUM 4 create device partition side on ATA SAMSUM 5 create formar sit s side on ATA SAMSUM 5 create formar sit s side on ATA SAMSUM			
	7 create format arts solad on ATA SAMSUAN 8 create format swap solad on ATA SAMSUAN	NZ71H512 5002538+001aca14 / frome NZ71H512 5002538+001aca14 Cancel & Return to Custom Partitioning	Accept Changes	
+ - C 2.3 MB 1 torage dente selected				Update Services Note: The settings pointake on the scene of net be applied unit you child on the mersion Reput seculation of bornor.

<u>Step 9</u>: Continue with the rest of the installation, following along with the proper whitepaper.

Red Hat	INSTALLATION SUMMARY				RED HAT ENTERPRISE LINUX	K 8.6 INSTALLATION
		LOCALIZATION	SOFTWARE	SYSTEM		
		English (US)	Connect to Red Hat Not registered.	Custom partitioning selected		
		Language Support English (United States)	Installation Source LABEL=RHEL-8-6-0-:	KDUMP Kdump is enabled		
		O Time & Date Americas/New York timezone	Software Selection Server with GUI	Network & Host Name		
		USER SETTINGS		Security Policy No profile selected		
		Root Password Root account is disabled.				
		User Creation				
					0.1	Ranja bestallation
					We won't touch your disks until	you click 'Begin Installation'.
	$\underline{\bigtriangleup}$. Please complete items marked with this icon before continuing to the n	ext step.				

<u>Step 10</u>: 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.

<u>Step 1</u>: 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.

ThinkStation.	Startup Device Me Network 1-[UEFI: PXE IPv4 In USB HDD 1-[UEFI: USB, Partit	e미니 tel(R) Ethernet Connection (17) I219-LM] tion 1]	
🝰 Boot Menu 삼 App Menu	Enter Setup		
Lenovo.	€€ Select Menu	Enter Select > Sub-Menu	ESC Exit
	Ve	ersion 2.21.0052. Copyright (C) 2023 AMI	

<u>Step 2</u>: 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.



<u>Step 4</u>: 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.

	Feb 23 19:18	<>
	Install	×
Welcome		
English Español Esperanto Euskara Français Gaeilge Galego Hrvatski Íslenska Italiano Kurdî Latviski Lietuviškai Magyar Nederlands No localization (UTF-8) Norsk bokmål	Try Ubuntu You can try Ubuntu without making this CD. Or if you're ready, you can install Ub operating system. This shouldn't ta	Install Ubuntu any changes to your computer, directly from puntu alongside (or instead of) your current ke too long.

<u>Step 5</u>: 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.

	Install	
Installation type		
This computer currently has Window	ws Boot Manager on it. What would you like to do?	
 Install Ubuntu alongside Win Documents, music, and other pers 	ndows Boot Manager sonal files will be kept. You can choose which operating system you want each time tl	he computer starts up
Erase disk and install Ubuntu	J rograms documents photos music and any other files in all operating systems	
Advanced features No	ne selected	
Vou can create or resize partitions	; yourself, or choose multiple partitions for Ubuntu.	

<u>Step 6</u>: Double-click on the Free Space of the storage drive to create a new partition. This can also be done by clicking the "+" button.

Activities	Install Ubuntu 22.04.1 LTS	Feb 23 15:14	enı 📢 🕛
9		Install	
	Installation type		
	□ free space 1.0 TB		
	Device Type Mount poin	t Format? Size Used	System
	/dev/nvme0n1		
	free space	1024209 MB	
•	+ – Change		New Partition Table Rev
	Device for boot loader installation:		
A	/dev/nvme0n1 SAMSUNG MZVL	LB1T0HBLR-000L7 (1.0 TB)	
			Quit Back Install N

<u>Step 7</u>: 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.

Activities	🖲 Install Ub	untu 22.04.1 LTS Feb	23 15:15		en ₁	()) (L L
			Install				
	Installatio	on type					
	free space	Creat	e partition	×			
	Device	Size:	1000	— МВ	-		
	/dev/nvme0n1 free space	Type for the new partition: Location for the new partition:	 Primary Logical Beginning of this sp 	ace	-		
\odot			O End of this space				
		Use as:	Ext4 journaling file sy	rstem ~			
	+ - chi	Mount point:	/boot	~	on Table		Rev
A	Device for boot /dev/nvme0n1		Cancel	ок	J		
				Quit B	ack	Insta	all N
						mace	
							1

<u>Step 8</u>: 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.



<u>Step 9</u>: 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.

. 🧐							
			Install				
	Installatio	on type					
	Generation free space	Creat	e partition	×			
	Device	Size:	500000 -	мв	-		
- 0	/dev/nvme0n1 free space /dev/nvme0n1 /dev/nvme0n1 free space	Type for the new partition: Location for the new partition:	 Primary Logical Beginning of this space End of this space 				
		Use as:	Ext4 journaling file system	~			
	+ - Chi Device for boot	Mount point:	/ ~		on Table.		Rev
Â	/dev/nvme0n1		Cancel O	к	}		
			Quit	B	ack	Ins	tall N

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.

ctivities	Install Ub	untu 22.04.1 LTS Feb	23 15:21 Install				en1	€ » ()
	Installatic	on type						
	☐ free space	Creat	e partition	1. 1. I.		×	ext4)	🗆 free spa
9	1.0 MB Device	Size:		1000	_	мв	-	522.2 GB
	/dev/nvme0n1	Type for the new partition:	O Primary					
	free space		Logical			•		
	/dev/nvme0n1	Location for the new partition:	O Beginning	g of this s	pace			
\odot	/dev/nvme0n1		O End of th	is space				
	free space	Use as:	EFI System	Partition		~		
	+ - Ch.			Cancel		OK	on Tab	Rev
	Device for boot	oader installation:						
	/dev/nvme0n1	SAMSUNG MZVLB1T0HBLR-0	00L7 (1.0 TB)					
					Quit	B	lack	Install N
:::								
•••								
				~ ~				

<u>Step 11</u>: 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.

<u>Step 13</u>: Arriving at the step to select where to install Windows, select the unallocated space leftover after the Linux install process.

) 💰 Wind	lows Setup					
Where	e do you wa	nt to install Wir	ndows?			
	Name		Total size	Free space	Туре	
-	Drive 0 Partitio	on 1	953.0 MB	0.0 MB	Primary	
	Drive 0 Partitio	on 2	954.0 MB	0.0 MB	Primary	
I all	Drive 0 Partitio	on 3	465.7 GB	0.0 MB	Primary	
I all	Drive 0 Partitio	on 4	954.0 MB	946.0 MB	System	
	Drive 0 Unallo	cated Space	485.4 GB	485.4 GB		
∜ ∱ <u>R</u> efr	resh	<u>N</u> elete	<u>Format</u>	<mark>∦</mark> N <u>e</u> w		
💽 Loa	d driver	Extend				
					Nex	t

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

DNU BRUB version 2.46	
<pre>statu docced allow for duoru wig'r frawe stifug uid'r frawe stifug High reads Advanced options for Ubuntu Advanced options for Ubuntu Advanced options for Ubuntu Windows Boot Manager (on /dev/nyme0nip1) UEFI Firmware Settings</pre>	
use the 1 and 1 keys to sublet which entry is highlighted. Press enter to bot the selected by, "t is diff the counds before bosing on "c' for a commad-line. SSC to return previous menu. The highlighted entry will be executed automatically in 6s.	

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.

Figure 1 – F12 Boot Menu Selection

Think@tation			
ININKSTATION	Startup Device M	lenu	
	Network 1-[UEFI: PXE IPv4 SATA 1-[Windows Boot Mar SATA 1-[Red Hat Enterprise	(ntel(R) Ethernet Connection (17) I219-LM] ager] Linux]	
🝰 Boot Menu	Enter Setup		
Lenovo			

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.

Figure 2 – BIOS Priority Boot Order by Bootable Partition

Priority Boot Order Start Menu	ThinkStation	\leftarrow	
Start Menu Main Main M 2 Drive 1 [ubuntu] Devices M 2 Drive 2 [None] M 2 Drive 2 [None] M 2 Drive 2 [None] Power PCLe Drive 2 [None] Becurity PCLe Drive 3 [None] PCLe Drive 3 [None] PCLe Drive 4 [None] PCLe Drive 4 [None] PCLe Drive 5 [None] PCLe Drive 5 [None] PCLe Drive 4 [None] PCLe Drive 4 [None] PCLe Drive 5 [None] PCLe Drive 5 [None] PCLe Drive 4 [None] PCLe Drive 5 [None] PCLe Drive 5 [None] PCLe Drive 5 [None] Network 1 [UEF]: PXE IPv4 Intel((R) Ethernet Connection (17) I219-LMI Safta 2 [None] PCLe Drive 5 [None]	i minotation.	Priority Boot Order	
Main M2 Drive 1 [ubuntu] M2 Drive 2 [None] M2 Drive 2 [None] Main NVME FlexBay Drive [None] M2 Drive 2 [None] PCLe Drive 2 [None] PCLe Drive 3 [None] PCLe Drive 3 [None] PCLe Drive 3 [None] PCLe Drive 4 [None] PCLE Drive 4 [None] PCLe Drive 5 [None] PCLE Drive 5 [None] PCLe Drive 6 [None] PCLE Drive 6 [None] PCLe Drive 5 [None] PCLE Drive 5 [None] PCLe Drive 6 [None] PCLE Drive 5 [None] PCLe Drive 5 [None] PCLE Drive 5 [None] Y SATA 2 [None] Y Satu Select Hemu Ext Select Hemu	Start Menu	1	
♀ Devices M2 Drive 1 [Windows boot manager] M2 Drive 2 [None] M2 Drive 2 [None] ♥ Advanced PCIe Drive 1 [Windows boot manager] ● Power PCIe Drive 2 [None] ● Security PCIe Drive 3 [None] ● Exit PCIe Drive 3 [None] PCIe Drive 3 [None] PCIe Drive 5 [None] PCIE Drive 6 [None] PCIe Drive 5 [None] PCIE Drive 6 [None] Network 1 [UEFI: PXE IPv4 Intel(R) Ethernet Connection (17) I219-LM] SATA 2 [None] */ Help *1 Help *1 Help *1 Select Item */ Sate 2 [None] */ Sate 2 [None]	🛱 Main	M.2 Drive 1 [ubuntu]	
	🙄 Devices	M.2 Drive 2 [Windows boot Manager]	
Power	X Advanced	NVME FlexBav Drive [None]	
PCIe Drive 2 [None] PCIe Drive 3 [None] PCIe Drive 4 [None] PCIe Drive 5 [No	Power	PCIe Drive 1 [None]	
Security PCIe Drive 3 [None] PCIe Drive 4 [None] PCIe Drive 5 [None] PCIe Drive 5 [None] PCIe Drive 5 [None] Network 1 [UEFI: PXE IPv4 Intel(R) Ethernet Connection (17) 1219-LM] SATA 2 [None] F1 Help F2 Exit * Select Item */* Select Nemu Exit *		PCIe Drive 2 [None]	
Startup PCIe Drive 4 [None] PCIe Drive 5 [None] PCIe Drive 5 [None] PCIe Drive 5 [None] PCIe Drive 6 [None] PCIe Drive 6 [None] Network 1 [UEFFI: PXE IPv4 Intel(R) Ethernet Connection (17) I219-LM] SATA 2 [None]	🗄 Security	PCIe Drive 3 [None]	
B Exit PCIe Drive 5 [None] PCIe Drive 6 [None] Network 1 [UEFI: PXE IPv4 Intel(R) Ethernet Connection (17) Izip-LM SATA 2 [None] F1 Help F2 Ethernet Connection (17) ESC Exit F3 Select Item F4 Select Item F5 Ethernet Select > 5ub-Menu F10 Save and Exit	🚣 Startup	PCIe Drive 4 [None]	
PCLe Drive 6 [None] Network 1 [UEFI: PXE IPv4 Intel(R) Ethernet Connection (17) 12.19-LM] SATA 2 [None] * F1 Help T4 Select Item */* Change Values F2 Select Item */* Select Item */* Select Nenu E10 Save and Dit	→ Exit	PCIe Drive 5 [None]	
Network 1 [UF]: PXE IPv4 Intel(R) Ethernet Connection (17) 1219-MI SATA 2 [None] F1 Help T4 Select Item 4* Select Item Etc Etc	-	PCIe Drive 6 [None]	
El Help ES Ebit SATA 2 [None] Sat		Network 1 [UEFI: PXE IPv4 Intel(R) Ethernet Connection (17) I219-LM]	
F1 Help 14 Select Item -/- Change Values F9 Setup Defaults ESC Exit 49 Select Nenu Enter Select >5ub-Menu F10 Save and Exit	Lenovo.	SATA 2 [None]	
ESC Exit	F1 Help	t Select Item +/- Change Values F9 Setup Defaults	
	ESC Exit	♦ Select Menu Enter Select > Sub-Menu F10 Save and Exit	

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.

		Priority Boot Order		
Start Menu				
	M.2 Drive 1: SAMSUNG M	ZVL2256HCHQ-00BL7	î	
🔂 Main	L ubuntu			
☆ Devices	Windows Boot Mar	nager		
₩ Advanced	M.2 Drive 2:			
φ -	PCIe Drive 1:			
O Power	PCIe Drive 2:			
🕂 Security	PCIe Drive 3:			
🚣 Startup	PCIe Drive 4:			
Ex. Evit	PCIe Drive 5:			
E EXIT	PCIe Drive 6:			
	SATA 1:			
	SATA 2:			
	SATA 3:			
	5474.4			

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