Ubuntu Linux 22.04 LTS 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 an Ubuntu Linux 22.04 LTS operating system on the ThinkStation PX, P7, and P5 platforms.

Section 1 – BIOS Setup

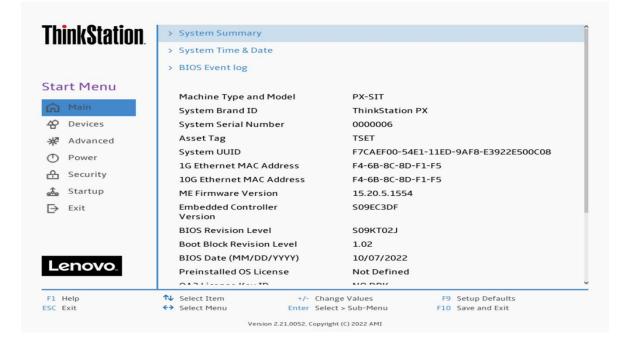
Prior to installing any operating system, it is important to make sure BIOS recognizes the storage devices appropriately.

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.

ThinkStation	Front Fan 2	Operating
i mininotution.	Front Fan 3	Operating
	Rear Fan 1-1	Operating
	Rear Fan 1-2	Operating
Start Menu	Flex Bay Fan 1	Operating
Main	Flex Bay Fan 2	Operating
P Devices	Flex Bay Fan 3	Not Operating
T Devices	PSU HDD Fan	Not Operating
* Advanced	M.2 Drive 1	SAMSUNG MZVL22T0HBLB-00BL7
Power	M.2 Drive 2	None
🔒 Security	M.2 Drive 3	None
Startup	MCIO Drive 1-1	None
	MCIO Drive 1-2	None
Exit Exit	MCIO Drive 2-1	None
	MCIO Drive 2-2	None
	PCIe Drive 1	None
	PCIe Drive 2	None
Lenovo	PCIe Drive 3	None
	PCIe Drive 4	None
F1 Help		ange Values F9 Setup Defaults
SC Exit	♦ Select Menu Enter Se	lect > Sub-Menu F10 Save and Exit

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

ThinkStation	<i>←</i>	
	Storage Setup	
Start Menu	SATA Controller Select whether to enable or disable SATA controller.	Enabled 🗸
Main	SATA Drive 1 Select whether to enable or disable SATA drive 1.	Enabled 🗸
* Advanced	SATA Drive 2 Select whether to enable or disable SATA drive 2.	Enabled 🗸
Power	SATA Drive 3 Select whether to enable or disable SATA drive 3.	Enabled 🗸
Security	SATA Drive 4 Select whether to enable or disable SATA drive 4.	Enabled 🗸
Exit	M.2 Drive 1 Select whether to enable or disable M.2 Drive 1.	Enabled 🗸
	M.2 Drive 2 Select whether to enable or disable M.2 Drive 2.	Enabled 🗸
Lenovo	M.2 Drive 3 Select whether to enable or disable M.2 Drive 3.	Enabled 🗸
	MCIO Drive 1-1	Enabled 🗸
F1 Help ESC Exit		F9 Setup Defaults F10 Save and Exit

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.

ThinkStation.	←	- firmentia -		
Start Menu	M.2 Slot1 Co	-	Auto	~
 Main ☆ Devices ☆ Advanced 	PCIe Port Link Sta PCIe Port Link Ma: PCIe Port Link Spe	x	Linked as x4 Max Width x4 Gen 4 (16.0 GT/s)	
Power Security Startup				
🚵 Startup [→ Exit				
Lenovo.				
F1 Help ESC Exit	 ↑↓ Select Item ↔ Select Menu 	+/- Change Values Enter Select > Sub-Menu	F9 Setup Defaults F10 Save and Exit	

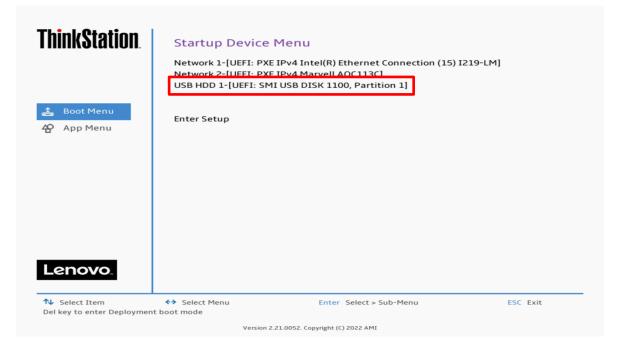
Here's an example of BIOS not recognizing a PCIe drive.



Section 2 – Ubuntu 22.04 Installation

Here are some step-by-step instructions on how to get an Ubuntu Linux 22.04 LTS operating system installed on the ThinkStation PX, P7, and P5 systems.

- 1. Obtain a copy of the Ubuntu 22.04 installation media. It is recommended to extract the Ubuntu 22.04 iso media to a USB.
- 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 'Try or Install Ubuntu' option from the GRUB boot menu and press 'Enter'.

GNU GRUB version 2.06	
∗Try or Install Ubuntu	
Ubuntu (safe graphics)	
OEM install (for manufacturers)	
Boot from next volume UEFI Firmware Settings	
Use the ▲ and ▼ keys to select which entry is highlighted.	
Press enter to boot the selected OS, `e' to edit the commands before booting or `c' for a command–line.	
The highlighted entry will be executed automatically in 29s.	

5. The Ubuntu installation media will begin to load.

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¢
C Ubuntu

6. The Ubuntu Linux Welcome screen should eventually appear. Select the appropriate language and select 'Install Ubuntu'.

	Install	×
Welcome		
English Español Esperanto Euskara Français Gaeilge Galego Hrvatski Íslenska Italiano Kurdi Latviski Lietuviškai Magyar Nederlands No localization (UTF-8) Norsk bokmål	Try Ubuntu Image: Compare the second sec	
	• • • • • • • • •	

7. Select the appropriate keyboard layout and 'Continue'.

In:	stall	×
Keyboard layout		
Choose your keyboard layout:		
English (Australian) English (Cameroon) English (Ghana) English (Nigeria) English (South Africa) English (UK) English (UK) Esperanto Estonian Faroese Filipino Finnish French	English (US) English (US) - Cherokee English (US) - English (Colemak) English (US) - English (Colemak-DH ISO) English (US) - English (Colemak-DH) English (US) - English (Dvorak) English (US) - English (Dvorak, alt. intl.) English (US) - English (Dvorak, intl., with dead keys) English (US) - English (Dvorak, intl., with dead keys) English (US) - English (Dvorak, left-handed) English (US) - English (Dvorak, right-handed) English (US) - English (Macintosh) English (US) - English (Norman) English (US) - English (VS, symbolic) English (US) - English (US, pymbolic)	
Type here to test your keyboard		
Detect Keyboard Layout	Quit Back Continue	:

8. Select the type of installation and 'Continue'. Note, if there is a valid internet connection on the system, the 'Other options' will be selectable.

Install	×
Updates and other software	
What apps would you like to install to start with? Normal installation Web browser, utilities, office software, games, and media players. Minimal installation Web browser and basic utilities. Other options	
Download updates while installing Ubuntu This saves time after installation.	
Install third-party software for graphics and Wi-Fi hardware and additional media formats. This software is subject to license terms included with its documentation. Some is proprietary.	
Quit Back Continue	:
$\bullet \bullet \bullet \circ \circ \circ$	

9. Select 'Erase disk and install Ubuntu' to automatically create the filesystem partitions and 'Continue'.

To manually create filesystem partitions, select 'Something else'.

In this document, 'Erase disk and install Ubuntu' has been selected.

Install	×
Installation type	
This computer currently has no detected operating systems. What would you like to do? C Erase disk and install Ubuntu Warning: This will delete all your programs, documents, photos, music, and any other files in all operating systems. Advanced features None selected	
Something else You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.	
Quit Back Install N	w

10. Select 'Continue' to confirm writing changes to the disk.



- 11. Select the appropriate geographical location and 'Continue'.

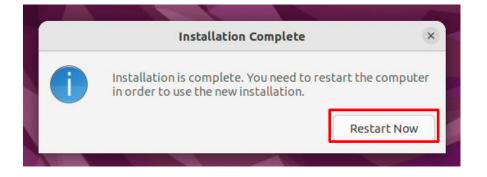
12. Fill in the appropriate boxes below and select 'Continue'.

	Install
Who are you?	
Pick a username: Choose a password: Confirm your password:	The name it uses when it talks to other computers.
	Back Continue
	•••••

13. Let the system finish the installation.



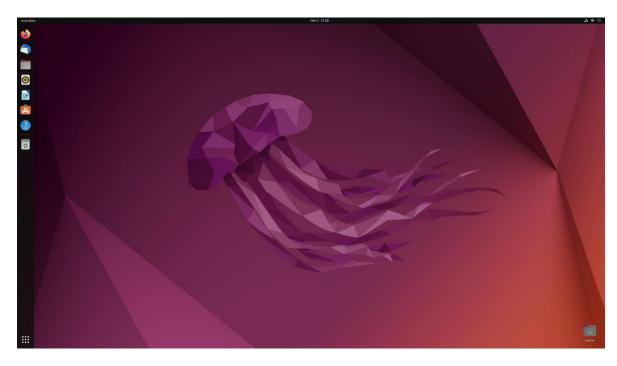
14. Once the installation completes, select 'Reboot Now'.



15. Remove the installation media (USB/DVD) and press 'Enter'.



16. Ubuntu 22.04 LTS 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 Ubuntu Linux 22.04 LTS 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 Ubuntu Linux.

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

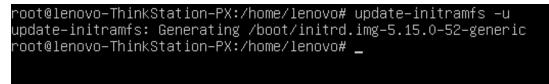
- Add the following line, 'blacklist nouveau', and save and exit the file.



3. Update the initramfs file and reboot the system.

update-initramfs -u

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).

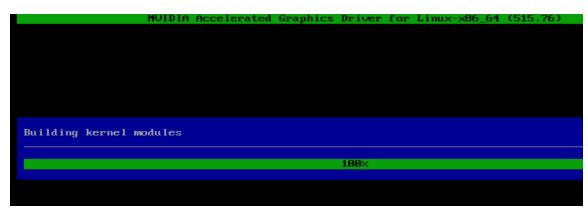
Ubuntu 22.04.1 LTS lenovo–ThinkStation–PX tty1 lenovo–ThinkStation–PX login: _

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*

```
[root@localhost ~]# cd /home/lenovo/Desktop/
[root@localhost Desktop]# ls
NVIDIA-Linux-x86_64-515.76.run
[root@localhost Desktop]# bash NVIDIA-Linux-x86_64-515.76.run _
```

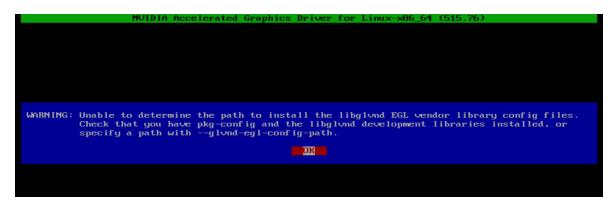
7. Note the driver should start to install.



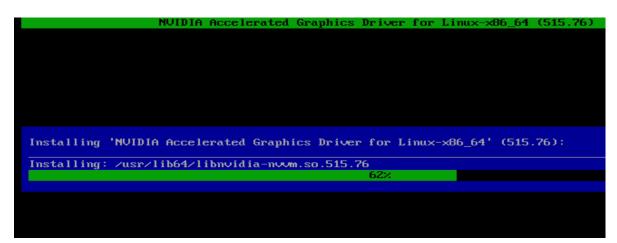
8. The driver will ask whether to install NVIDIA's 32-bit compatibility libraries. *In this example, 'yes' was selected.*

NVIDIA	Accelerated	Graphics	Driver	for	Linux-x86	_64	(515.)	76)
Install NVIDIA's 32-bit (compatibility	y librario	es?					
	Yes				No			
	ites				no			

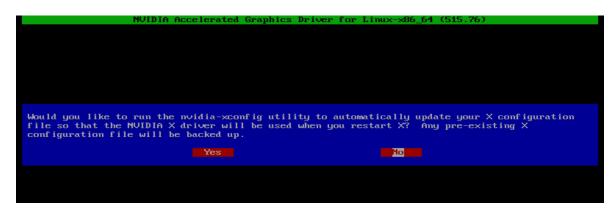
9. Select 'OK' on the following warning message.



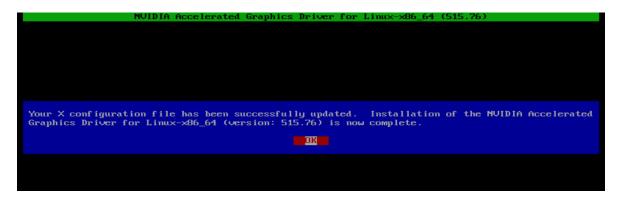
10. The driver should continue to install.



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

NVID	IA-SMI	515.7	6 D	river _.	Version:	515.	76	CUDA Versio	on: 11.7
GPU Fan									Uncorr. ECC Compute M. MIG M.
===== 0 32%		PO		31W	OM	liB ∕	4096MiB		N/A Default N/A
 Proc GPU	esses: GI ID		PID		e Proc			+	GPU Memory Usage
===== No	====== runnin;	====== g proc	======== esses fou	====== nd	=======	=====		===========	

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Revision History

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