Ubuntu Linux 22.04 LTS Installation

Lenovo ThinkStation P3 Tower, Ultra, Tiny



Table of Contents

Overview	3
Section 1 – BIOS Setup	4
Section 2 – Ubuntu 22.04 Installation	7
Section 3 – Install Device Drivers	15
Section 4 – Install Nvidia Proprietary Drivers	16
Revision History	24

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 new ThinkStation P3 Family platforms.

Section 1 – BIOS Setup

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.



• Tab over to the Security tab and select "Secure Boot".



• Ensure that Secure Boot option is set to "Disabled".



• Save changes by pressing F10 function key.

	\leftarrow	
	Secure Boot	
Charles A.	System Mode	Deployed Mode
Start Menu		
Main	Secure Boot	Disabled 🗸
& Devices	[Disabled] [
₩ Advanced	Save configuration and reset?	
O Power	> Restore Fa	
	Restore Fact	
🖧 Startup	> Reset Plat	
[→ Exit	Reset to set	
	> Exit Deplo	
	Transition between deproyment and oper mode.	
Lenovo	> Key Management Enables users to modify Secure Boot Policy variables.	
	Select Item +/- Change Values Select Manu Select Sub-Manu	F9 Setup Defaults

6

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Section 2 – Ubuntu 22.04 Installation

Here are step-by-step instructions on how to install an Ubuntu Linux 22.04 LTS operating system on the new ThinkStation P3 family platforms.

- 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.

Boot Menu App Menu			
N Select Item Delete key to enter Deployment Boot Moo	←→ Select Menu le	Enter Select > Sub-Menu	ESC Exit

<u>Note:</u> Legacy boot is not supported on P3 platforms. Only UEFI bootable options will be available.

4. Select the 'Try or Install Ubuntu' option from the GRUB boot menu and press 'Enter'.

≭Try or Install Ubuntu Ubuntu (safe graphics) ΟΕΜ 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.

Lenovo	
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 Try Ubuntu Vou can try Ubuntu without making any changes to your computer, directly from this CD. Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This shouldn't take too long.	
	• 0 0 0 0 0 0	

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

Ins	stall	×		
Keyboard layout				
Choose your keyboard layout:				
English (Australian) English (Cameroon) English (Ghana) English (South Africa) English (South Africa) English (UK) English (US) 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, 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 (Morark, right-handed) English (US) - English (Macintosh) English (US) - English (Norman) English (US) - English (VG, Symbolic) English (US) - English (US, Symbolic)			
Type here to test your keyboard				
Detect Keyboard Layout Quit Back Continue				

8. If a wireless module is installed in the system, the installation media may prompt the user to connect to a network. In this example, '*I don't want to connect to a Wi-Fi network right now*' was selected.

	Install			
Wireless				
connecting this computer to a WI-Fi network allo	ws you to install third-party	software, down	iload updates, a	utomatically
O I doo't want to connect to a Wi-E network of	inht na v			
Connect to this network	The second data			
~ Intel Corporation				
- Carl Barra				
and the second s				
(1)				
- (and a set of a set				
- The second second				
- management of				
CONTRACT ACTUAL				
		Quit	Back	Continue

9. Select the type of installation and 'Continue'.

<u>Note</u>: If there is a valid internet connection on the system, items available under the 'Other options' sections will be selectable.

Install			×
Updates and other software			
What apps would you like to install to start with? Vormal installation Web browser, utilities, office software, games, and media players. Minimal installation			
Web browser and basic utilities.			
 Download updates while installing Ubuntu This saves time after installation. Install third-party software for graphics and Wi-Fi hardware and addition. This software is subject to license terms included with its documentation. Some is propried 	al media format ietary.	:5	
	Quit	Back	Continue
$\bullet \bullet \bullet \bullet \circ \circ \circ$			

10. Select 'Erase disk and install Ubuntu' to automatically create the file system partitions and 'Continue'.

To manually create file system partitions, select 'Something else'.

Note: If the disk has data on it already the options here may be different.

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

Install	×
Installation type	
 This computer currently has no detected operating systems. What would you like to do? Frase 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 Now	7

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



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

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

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

14. Let the system finish the installation.



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



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



17. Ubuntu 22.04 LTS Desktop screen.



Section 3 – Install Device Drivers

Most of the standard building blocks used in the ThinkStation P3 platform are native to the Ubuntu Linux 22.04 LTS base kernel. Installing a proprietary graphics driver is recommended to get optimal performance from the graphics card. The next sections provide step-by-step instructions on how to install a proprietary Nvidia graphics driver in Ubuntu Linux.

<u>Note 1:</u> All commands need to be executed with superuser privileges in the following sections. All commands that need to be typed in, start with the # sign.

<u>Note 2:</u> Non-native drivers need to be manually installed. Refer to the vendor's documentation for a detailed process of obtaining and installing drivers.

Section 4 – Install Nvidia Proprietary Drivers

Newer versions of Nvidia driver require to have GCC version 12. Here are steps how to update the GCC version:

1. Check current GCC version.

#gcc –version

□	- Q			×
<pre>lenovo@lenovo-ThinkStation-P3-Tower:~{ gccversion gcc (Ubuntu 11.4.0-1ubuntu1~22.04) 11.4.0 Copyright (C) 2021 Free Software Foundation, Inc. This is free software; see the source for copying condi warranty: not even for MERCHANTABILITY or FITNESS FOR A</pre>	tions.	There LAR PU	is NO RPOSE	

2. Update the repository information.

#sudo apt update

F	lenovo@lenovo-Thin	nkStation-P3-Tower: ~	Q			
lenovo@lenovo-Think gcc (Ubuntu 11.4.0- Copyright (C) 2021 This is free softwa warranty; not even	Station-P3-Tower:~\$ go Lubuntu1~22.04) 11.4.0 Free Software Foundati re; see the source for for MERCHANTABILITY of	ccversion 0 ion, Inc. r copying conditior r FITNESS FOR A PAF	ns. There RTICULAR PU	is NC RPOSE)	
lenovo@lenovo-Think Hit:1 http://us.arc Hit:2 http://us.arc Hit:3 http://us.arc Hit:4 http://securi Reading package lis Building dependency Reading state inform 545 packages can be	Station-P3-Tower:~\$ su nive.ubuntu.com/ubuntu nive.ubuntu.com/ubuntu nive.ubuntu.com/ubuntu ty.ubuntu.com/ubuntu ts Done tree Done mation Done upgraded. Run 'apt li	udo apt update u jammy InRelease u jammy-updates InF u jammy-backports I jammy-security InRe istupgradable' t	Release InRelease elease to see them			

3. Install the software Properties Common Package.

#sudo apt install software-properties-common

ান lenovo@lenovo-ThinkStation-P3	Tower: ~ Q			
<pre>lenovo@lenovo-ThinkStation-P3-Tower:~\$ sudo apt i</pre>	nstall software	-properti	ies-co	omm
on				
Reading package lists Done				
Building dependency tree Done				
Reading state information Done				
The following additional packages will be install	ed:			
python3-software-properties software-properties	-gtk ubuntu-adv	antage-to	ools	
ubuntu-pro-client				
Recommended packages:				
ubuntu-pro-client-l10n				
The following NEW packages will be installed: ubuntu-pro-client				
The following packages will be upgraded:				
python3-software-properties software-properties	-COMMON			
software-properties-gtk ubuntu-advantage-tools				
4 upgraded, 1 newly installed, 0 to remove and 54	1 not upgraded.			
Need to get 322 kB of archives.				
After this operation, 1,304 kB disk space will be Do you want to continue? [Y/n] []	freed.			

4. Add the GCC Repository.

#sudo add-apt-repository ppa:ubuntu-toolchain-r/test

	hinkStation-P3-Tower: ~	Q =			
lenovo@lenovo-ThinkStation-P3-Tower:~\$	sudo add-apt-reposi	tory ppa:ub.	untu-	-tool	lch
PPA publishes dbgsym, you may need to i	.nclude 'main/debug'	component			
Repository: 'deb https://ppa.launchpado / jammy main'	content.net/ubuntu-t	:oolchain-r/	test/	/ubur	ntu
Description:					
Toolchain test builds; see https://wiki	uduntu.com/loolCha	itn			
More info: https://launchpad.net/~ubunt	u-toolchain-r/+arch	ive/ubuntu/	test		
Press [ENTER] to continue or Ctrl-c to	cancel.				

5. Install the desired GCC version.

#sudo apt install gcc-12 g++-12

lenovo@lenovo-ThinkStation-P3-Tower:~\$ sudo apt install gcc-12 g++-12 Reading package lists... Done Building dependency tree... Done Reading state information... Done The following additional packages will be installed: cpp-12 gcc-13-base libasan8 libgcc-12-dev libstdc++-12-dev libtsan2 Suggested packages: gcc-12-locales cpp-12-doc g++-12-multilib gcc-12-doc gcc-12-multilib libstdc++-12-doc The following NEW packages will be installed: cpp-12 g++-12 gcc-12 gcc-13-base libasan8 libgcc-12-dev libstdc++-12-dev libtsan2 0 upgraded, 8 newly installed, 0 to remove and 549 not upgraded. Need to get 55.1 MB of archives. After this operation, 199 MB of_additional disk space will be used. Do you want to continue? [Y/n]

6. Configure the default GCC version.

#sudo update-alternatives --install /usr/bin/gcc gcc /usr/bin/gcc-12 100 -slave /usr/bin/g++ g++ /usr/bin/g++-12



7. Verify updated version GCC.

#gcc –version

lenovo@lenovo-ThinkStation-P3-Tower:~\$ gcc --version
gcc (Ubuntu 12.3.0-1ubuntu1~22.04) 12.3.0
Copyright (C) 2022 Free Software Foundation, Inc.
This is free software; see the source for copying conditions. There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

The below step-by-step instructions on how to install Nvidia proprietary drivers.

- 1. Download the appropriate Nvidia graphics driver from the Lenovo Support portal.
- 2. Blacklist the Linux Nouveau driver.
 - # nano /etc/modprobe.d/blacklist.conf
 - Add the following line, 'blacklist nouveau', and save and exit the file.

□ root@lenovo-30GR123456: /home/lenovo Q	Ξ			×			
GNU nano 6.2 /etc/modprobe.d/blacklist.conf * # replaced by b43 and ssb. blacklist bcm43xx							
# most apps now use garmin usb driver directly (Ubuntu: #114565) blacklist garmin_gps							
# replaced by asus-laptop (Ubuntu: #184721) blacklist asus_acpi							
# low-quality, just noise when being used for sound playback, causes # hangs at desktop session start (Ubuntu: #246969) blacklist snd_pcsp							
<pre># ugly and loud noise, getting on everyone's nerves; this should be done by a # nice pulseaudio bing (Ubuntu: #77010) blacklist pcspkr</pre>							
# EDAC driver for amd76x clashes with the agp driver preventing the aperture # from being initialised (Ubuntu: #297750). Blacklist so that the driver # continues to build and is installable for the few cases where its # really needed. blacklist amd76x_edac							
blacklist nouveau							
File Name to Write: /etc/modprobe.d/blacklist.conf ^G Help M-D DOS Format M-A Append M-B Baa ^C Cancel M-M Mac Format M-P Prepend ^T Browner	ickup F	ile					

- 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–30GR123456 tty1 lenovo–30GR123456login: _

- 6. Navigate 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*

```
lenovo@lenovo–30GR123456:~$ sudo su
[sudo] password for lenovo:
root@lenovo–30GR123456:/home/lenovo# cd Downloads/
root@lenovo–30GR123456:/home/lenovo/Downloads# bash ./NVIDIA–Linux–x86_64–525.78.01.run _
```

7. Note the driver should start to install.

NUID	IA Accelerated	Granhics	Driver f	or $Linux - \sqrt{86}$	64 (51	5 761
11011	in necciciatea	druphics	DI IVEI I	of Linux 200	_01 (31	.5.107
Building kernel module:	S					
			100%			

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-xa	36_64	(515.	.76)
Install NVIDIA's 32-bit o	compatibility	y librario	es?					
	Yes				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, then reboot the system.

nvidia-smi

Thu Jan 19 13:54:18 2023 NVIDIA-SMI 515.65.01 Driver Version: 515.65.01 CUDA Version: 11.7 GPU Persistence-M Bus-Id Disp.A Volatile Uncorr. ECC Name GPU-Util Compute M. Perf Fan Temp Pwr:Usage/Cap Memory-Usage MIG M. NVIDIA T400 Off 00000000:01:00.0 On N/A 38% 33C Ρ8 N/A / 31W 1MiB / 2048MiB 0% Default N/A Processes: GPU GΙ CI PID Туре Process name GPU Memory ID ID Usage No running processes found oot@lenovo-30GR123456:/home/lenovo# _

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		6
		C
		Λ
-		

Revision History

Version	Date	Author	Changes/Updates
1.1	3/27/2024	A. Panteleev	Updated Section 4
1.0	5/23/2023	A. Panteleev	Initial launch release.