

# Ubuntu Linux 20.04 LTS Installation

Lenovo ThinkStation P620



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## Section 1 - BIOS Setup & Preinstallation Steps

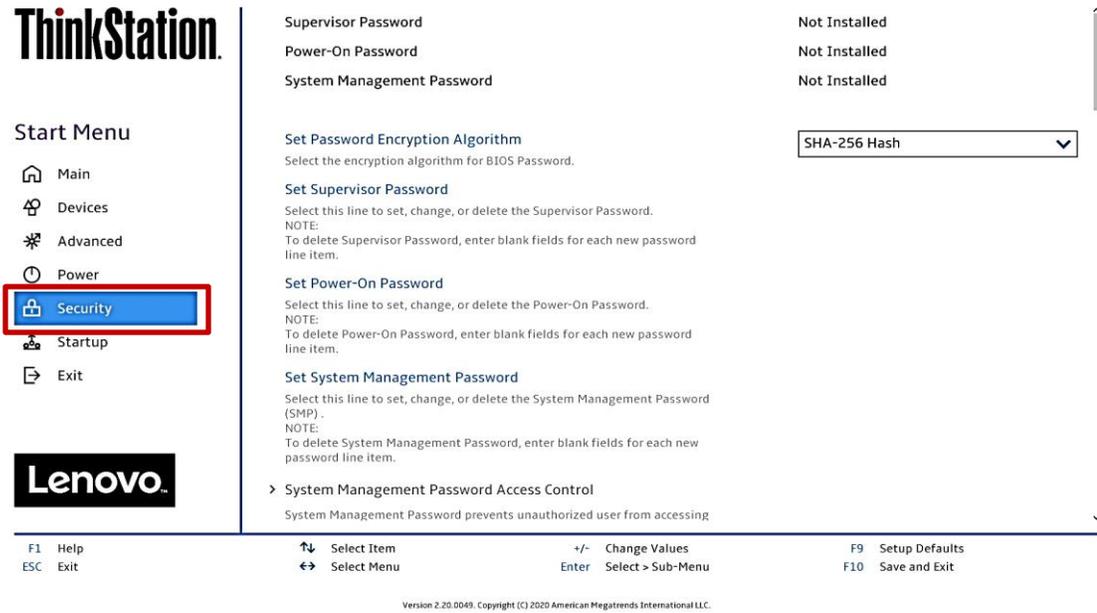
The first step before installing Linux is to make sure the system BIOS is setup correctly. Follow the steps below to ensure a few BIOS settings are set appropriately.

- Boot into BIOS setup by pressing the function F1 key at the “Lenovo” splash screen.

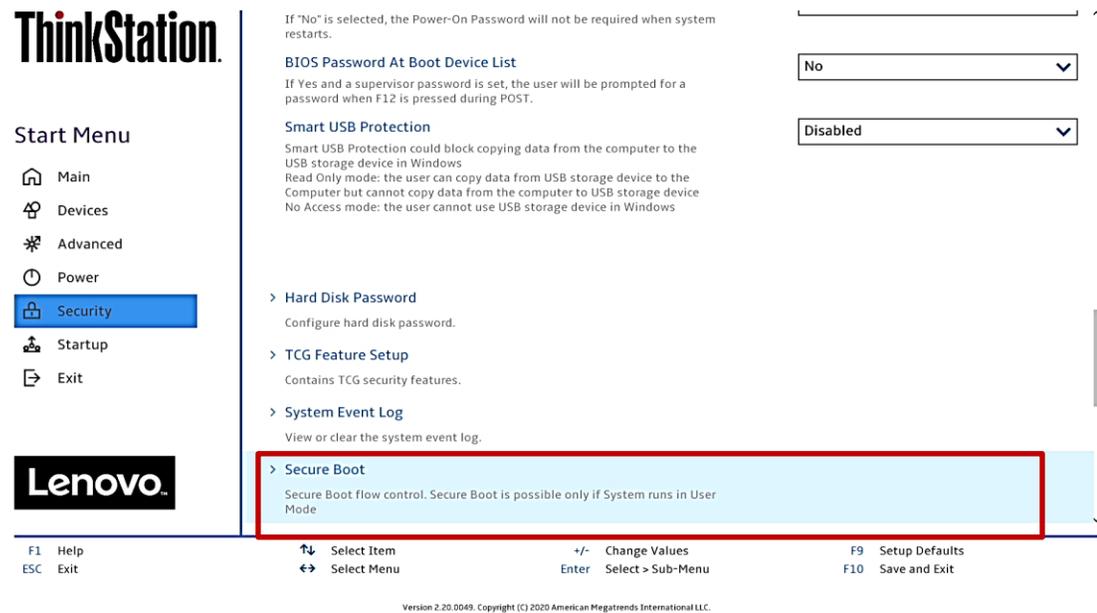
A black rectangular splash screen with the word "Lenovo" in white, sans-serif font centered in the middle. The trademark symbol (TM) is visible to the right of the word.

Lenovo™

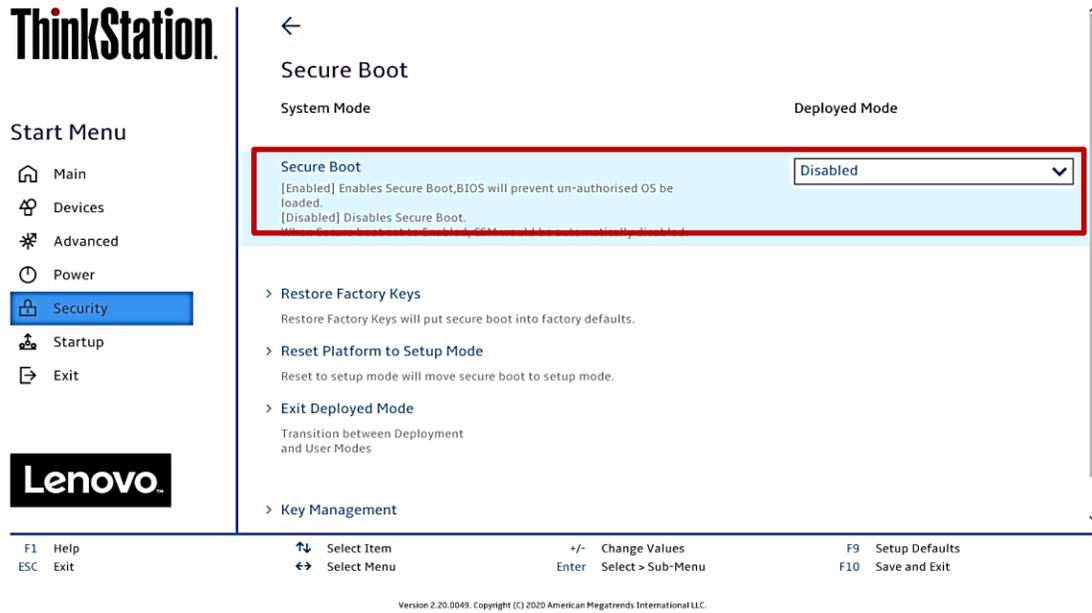
- On the main start menu within BIOS setup, select the “Security” option.



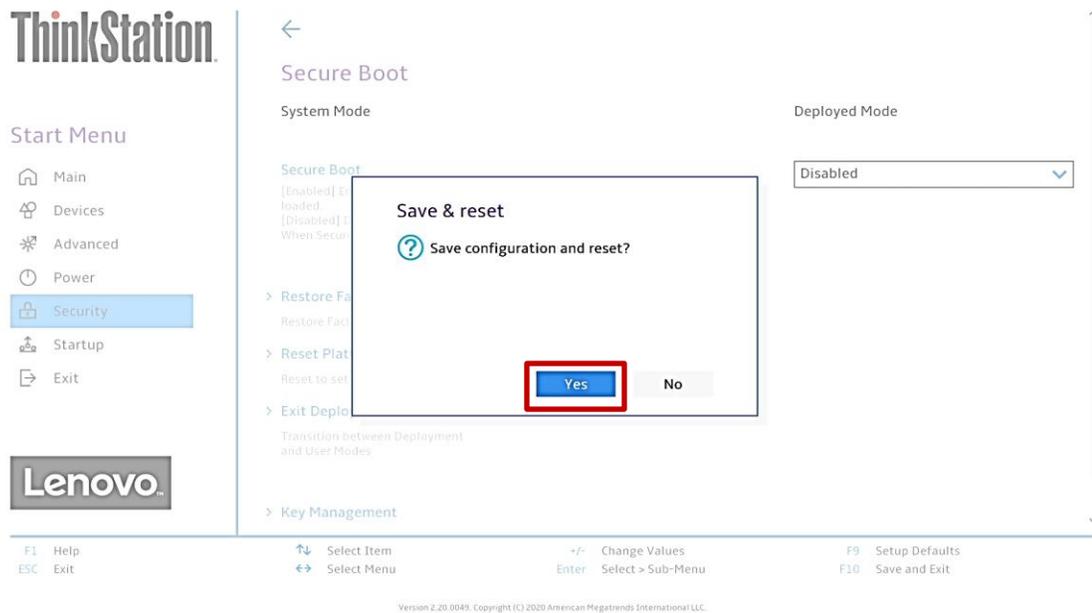
- On the “Security” menu tab, scroll down and select the “Secure Boot” option.



- Set the “Secure Boot” drop-down option to “Disabled”.



- Press the function F10 key to “Save & Exit” the BIOS setup menu and select “Yes” on the pop-up window that’ll appear.



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## Section 2 – Installing Ubuntu Linux 20.04 LTS

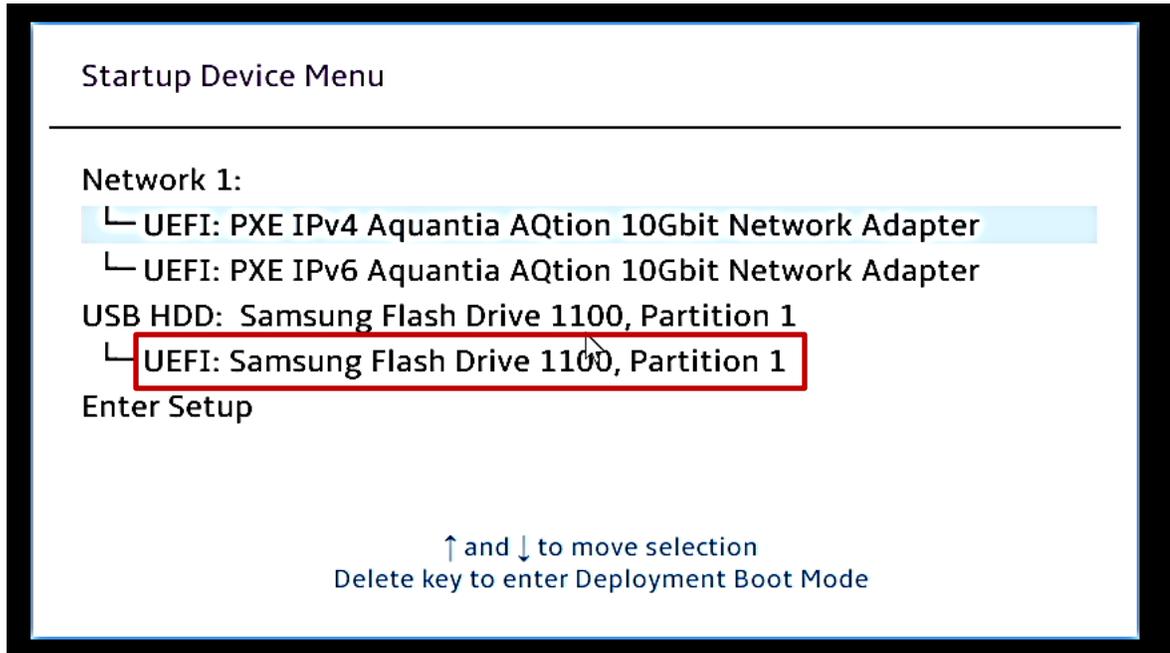
Please refer to the following instructions and screenshots on how to install Ubuntu Linux 20.04 LTS on the Lenovo ThinkStation P620.

- Insert the Ubuntu 20.04 installation media either through USB or CD/DVD.
- Power on the system and press the function F12 key when the Lenovo splash screen appears.

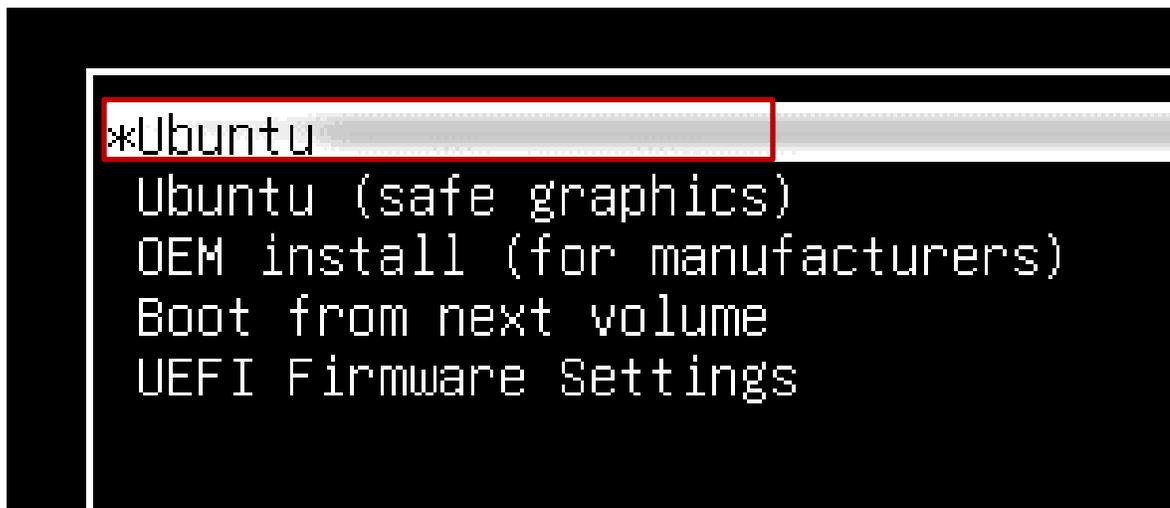
A black rectangular area representing a splash screen with the white "Lenovo" logo centered in the middle.

Lenovo™

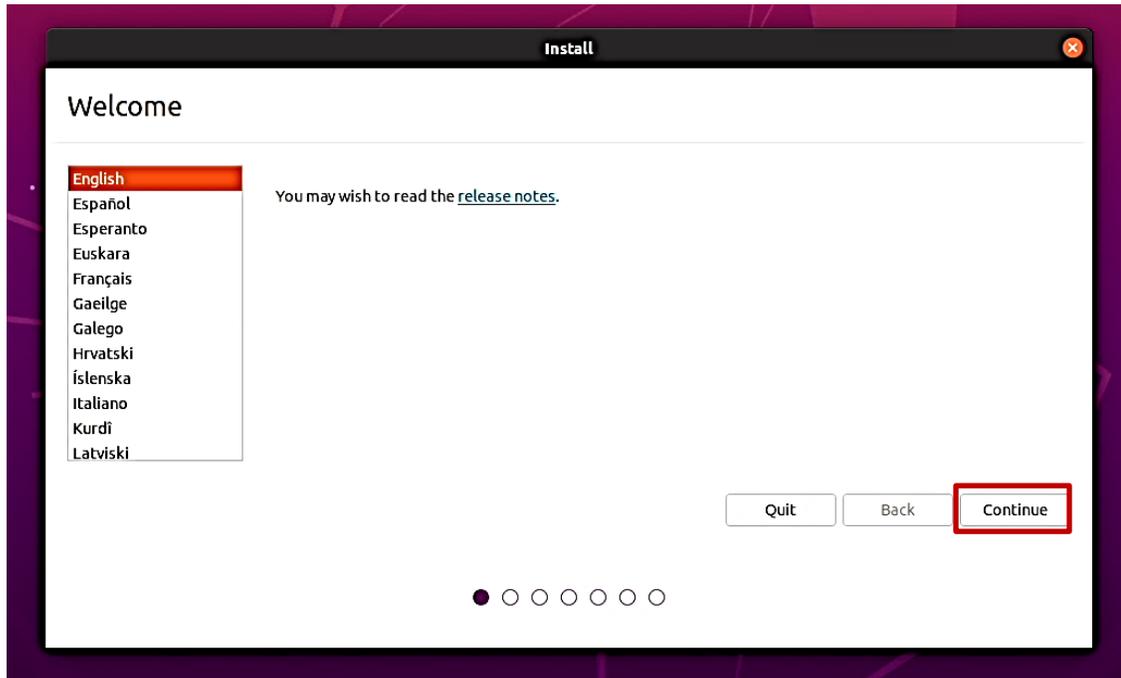
- Select the Linux bootable installation media from the Startup Device Menu.



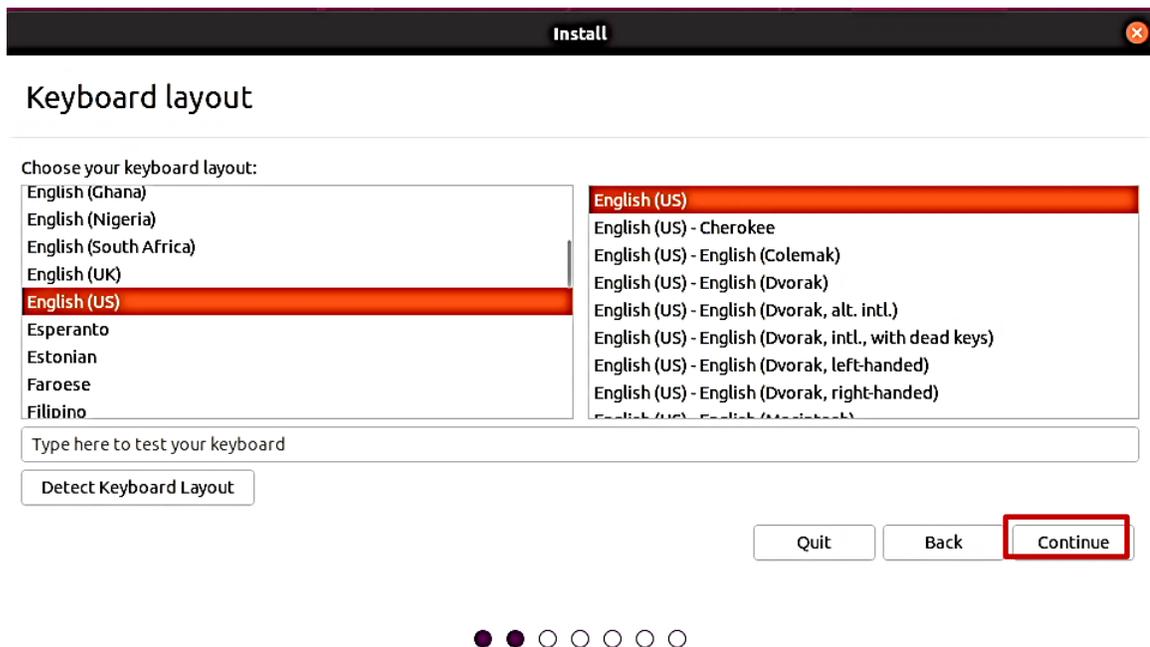
- Select the “Ubuntu” option from the GRUB boot menu, and press enter.



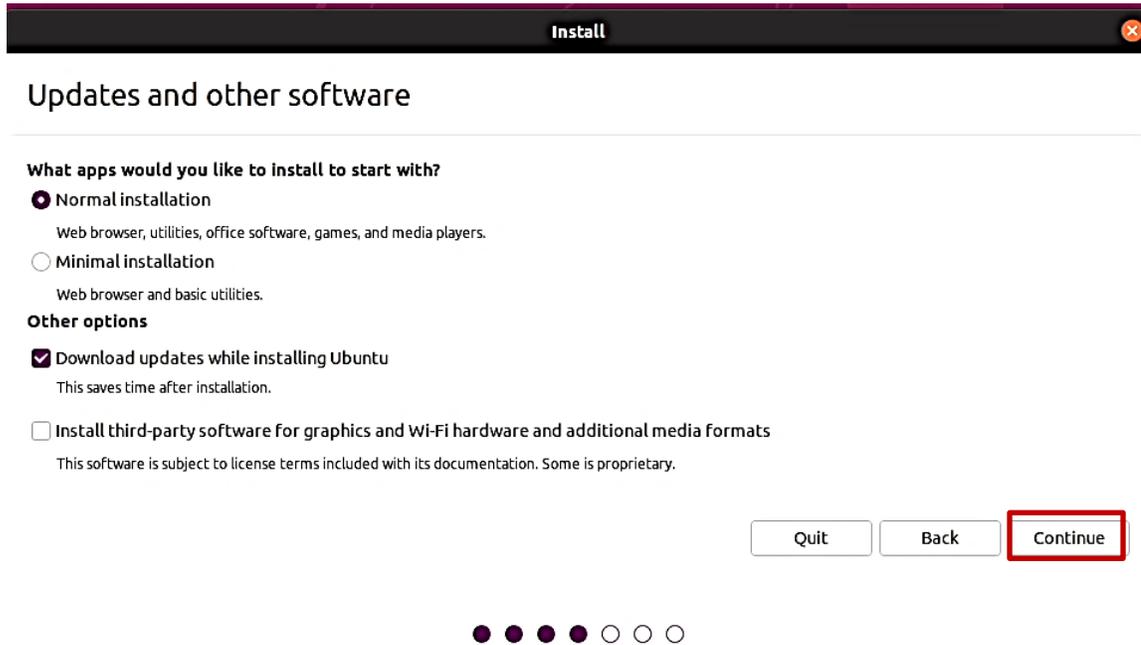
- The Ubuntu Linux Welcome Screen should appear. Select the appropriate language and “Continue”.



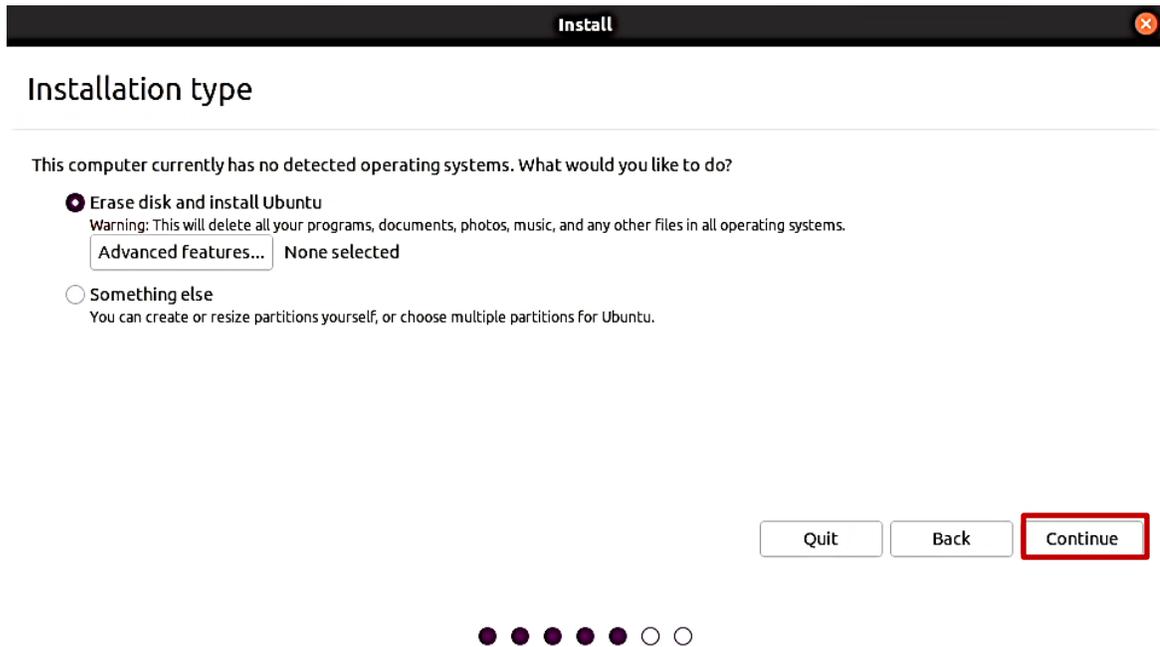
- Select the appropriate keyboard layout and “Continue”.



- Select the type of installation and whether to install updates and “Continue”.

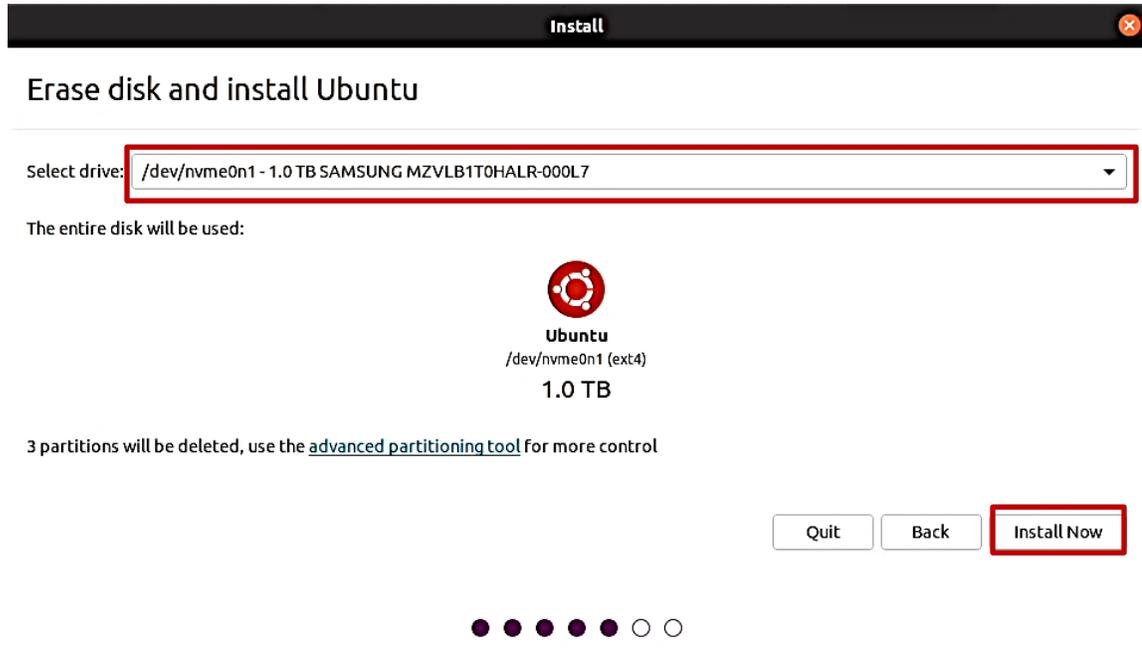


- Select “Erase disk and install Ubuntu” to automatically create the filesystem partitions and “Continue”.

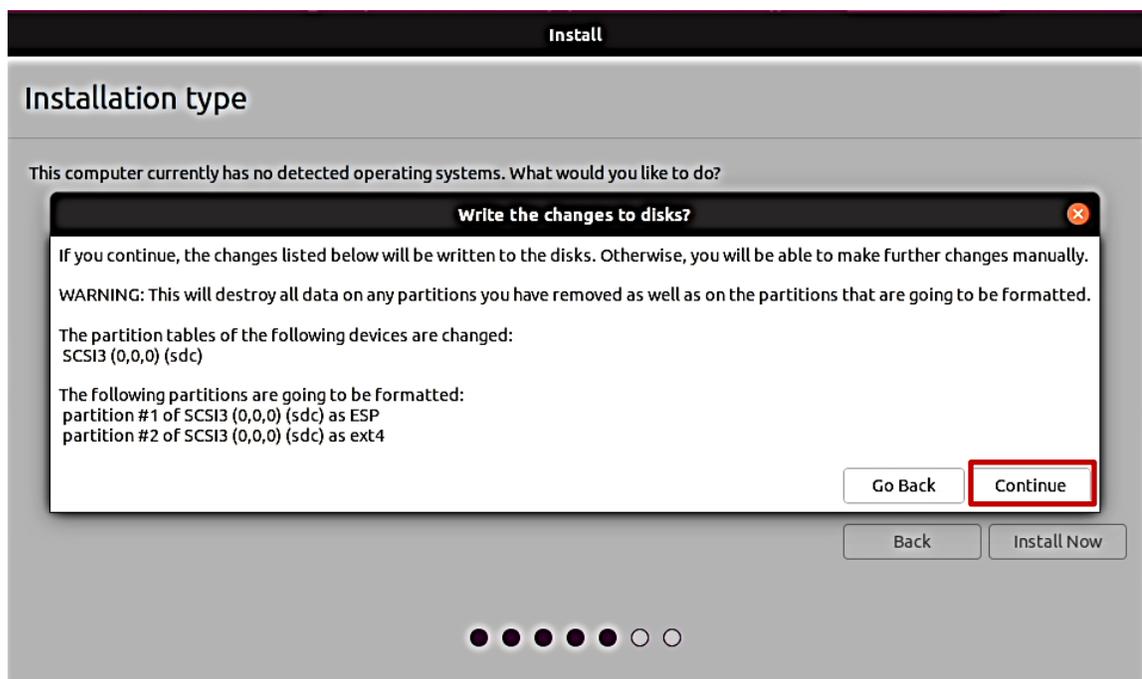


- Select the drive from the dropdown menu on where to install the Ubuntu image and select “Install Now”.

*For AMD RAID arrays, see Section 3 below.*



- Select “Continue” to confirm writing changes to the disk.



- Select the appropriate geographical location and “Continue”.

**Install**

Where are you?



New York

● ● ● ● ● ● ○

- Fill in the appropriate boxes below and select “Continue”.

**Install**

Who are you?

Your name:

Your computer's name:   
The name it uses when it talks to other computers.

Pick a username:

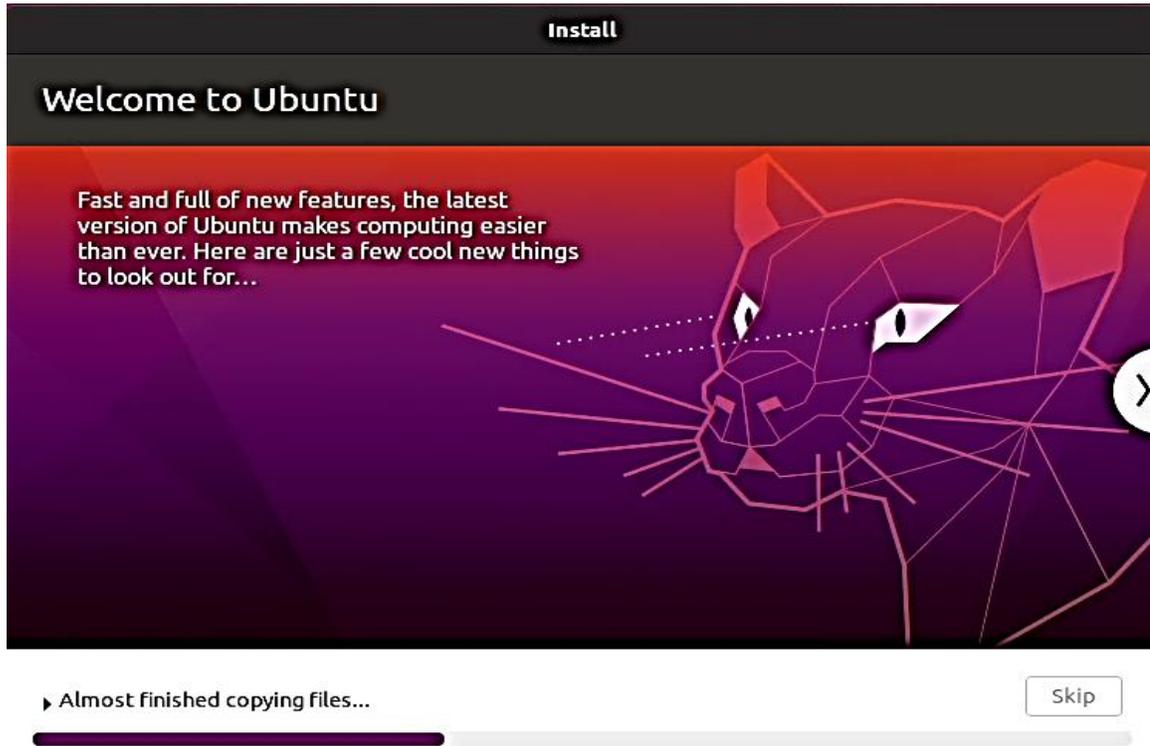
Choose a password:

Confirm your password:

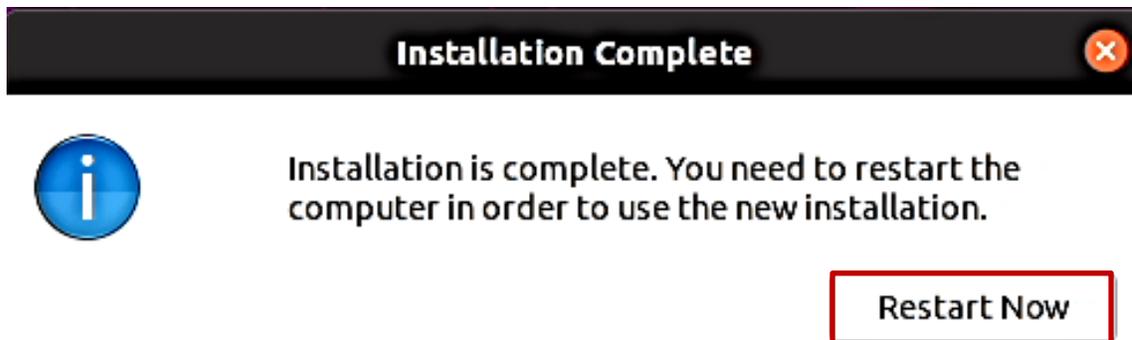
Log in automatically  
 Require my password to log in

● ● ● ● ● ● ●

- Let the system finish the installation.



- Once the installation completes, select "Restart Now".



- Remove the installation media (USB/DVD) and press ENTER.



- Ubuntu Linux 20.04 LTS Desktop screen.



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## Section 3 – RAID Array Installation

Please refer to the following instructions and screenshots on how to install Ubuntu Linux 20.04 LTS utilizing RAID arrays on the Lenovo ThinkStation P620.

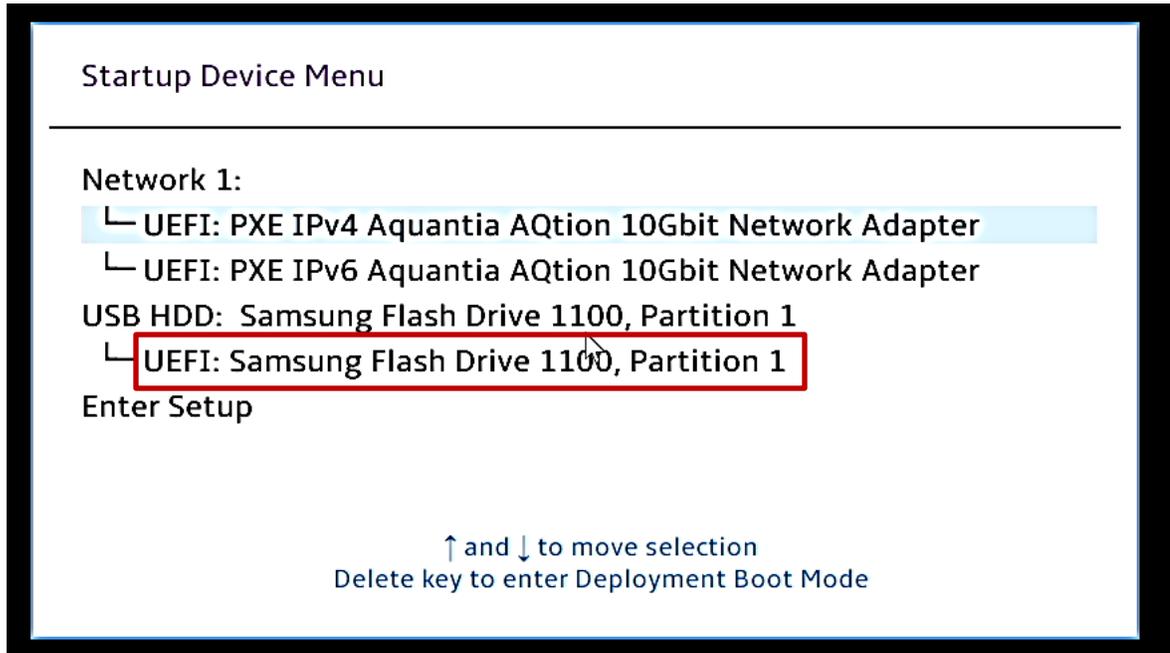
**Note:** This is assuming storage RAID is already set up and configured in BIOS.

**Note:** For installing later kernel versions of Ubuntu 20.04, AMD's guidance is to install Ubuntu 20.04.00, then upgrade and resync with the driver.

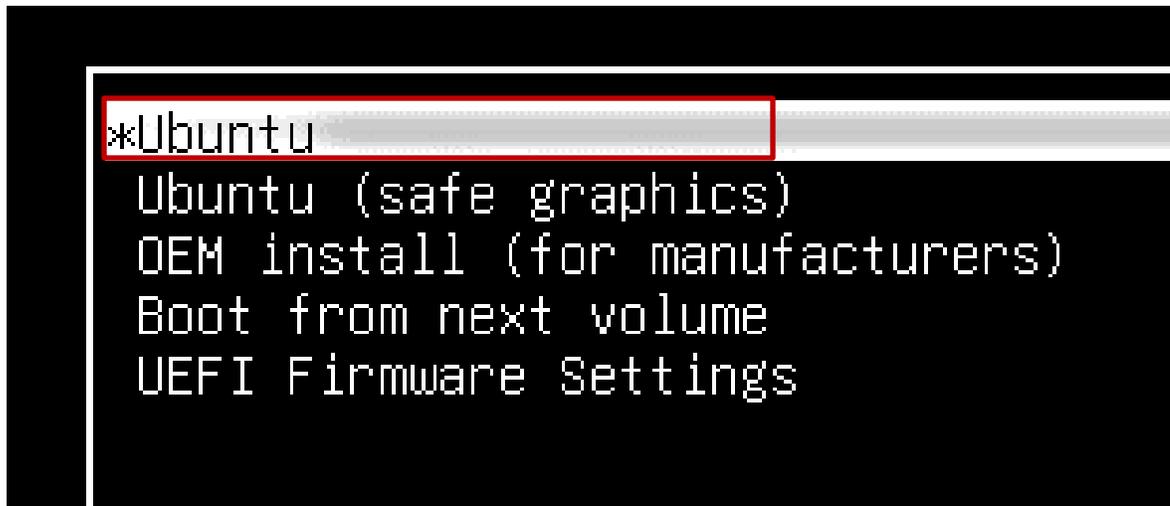
- Download the Linux AMD storage RAID driver from the Lenovo support site and copy the contents onto a directory labelled 'dd' from the root of a USB flash drive.
- Insert the Ubuntu 20.04 installation media either through USB or CD/DVD.
- Power on the system and press the function F12 key when the Lenovo splash screen appears.

A large black rectangular area containing the white "Lenovo" logo in the center.

- Select the Linux bootable installation media from the Startup Device Menu.



- Select the “Ubuntu” option from the GRUB boot menu, and press ‘e’.



- Add the following lines to the end of the Linux kernel command parameter and press CTRL-X.

*“break=mount modprobe.blacklist=ahci,nvme nomodeset”*

```

GNU GRUB version 2.04

setparams 'Ubuntu'

set gfxpayload=keep
linux /casper/vmlinuz file=/cdrom/preseed/ubuntu.seed maybe-ubiquity quiet splash --- break=mount modprobe.blacklist=ahci,nvme nomodeset_
initrd /casper/initrd

```

- At the “BusyBox” shell, insert the USB flash drive with the Linux AMD RAID driver into a USB port of the system and mount it using the following command:

*“mount -t vfat /dev/sdb1 /tmp”*

**Note:** /dev/sdb1 may need to be changed depending on the number of devices attached to the system.

```

BusyBox v1.30.1 (Ubuntu 1:1.30.1-4ubuntu6) built-in shell (ash)
Enter 'help' for a list of built-in commands.

(initramfs) mount -t vfat /dev/sdb1 /tmp

```

- Copy the contents of the driver to the root directory using the following command:

*“cp -ap /tmp/dd /”*

```

BusyBox v1.30.1 (Ubuntu 1:1.30.1-4ubuntu6) built-in shell (ash)
Enter 'help' for a list of built-in commands.

(initramfs) mount -t vfat /dev/sdb1 /tmp
(initramfs) cp -ap /tmp/dd /

```

- Install the driver by running the following command:

*“/dd/pre\_install”*

```
BusyBox v1.30.1 (Ubuntu 1:1.30.1-4ubuntu6) built-in shell (ash)
Enter 'help' for a list of built-in commands.

(initramfs) mount -t vfat /dev/sdb1 /tmp
(initramfs) cp -ap /tmp/dd /
(initramfs) /dd/pre_install
```

- Unmount and remove the USB flash drive by running the following command:

*“umount /tmp”*

```
BusyBox v1.30.1 (Ubuntu 1:1.30.1-4ubuntu6) built-in shell (ash)
Enter 'help' for a list of built-in commands.

(initramfs) mount -t vfat /dev/sdb1 /tmp
(initramfs) cp -ap /tmp/dd /
(initramfs) /dd/pre_install
Symbolically linking: /sbin/insmod
(initramfs)
(initramfs) umount /tmp
```

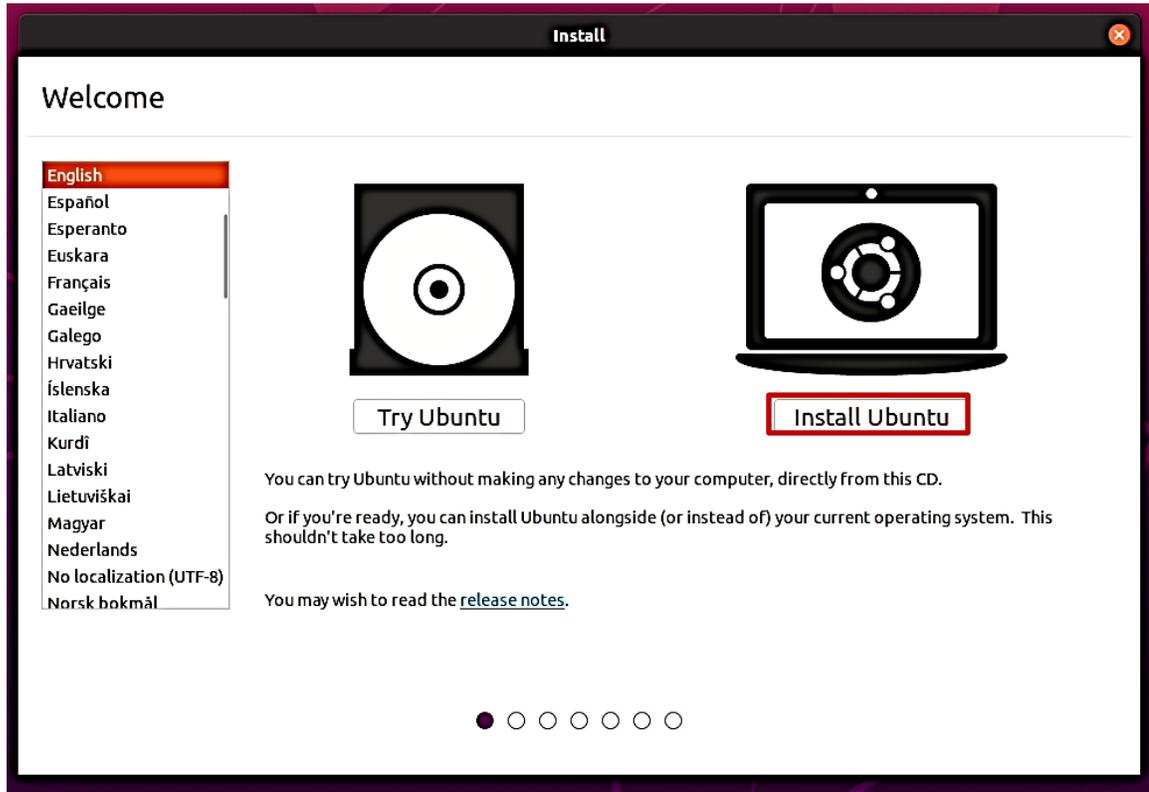
- Exit the busybox shell by running the following command:

*“exit”*

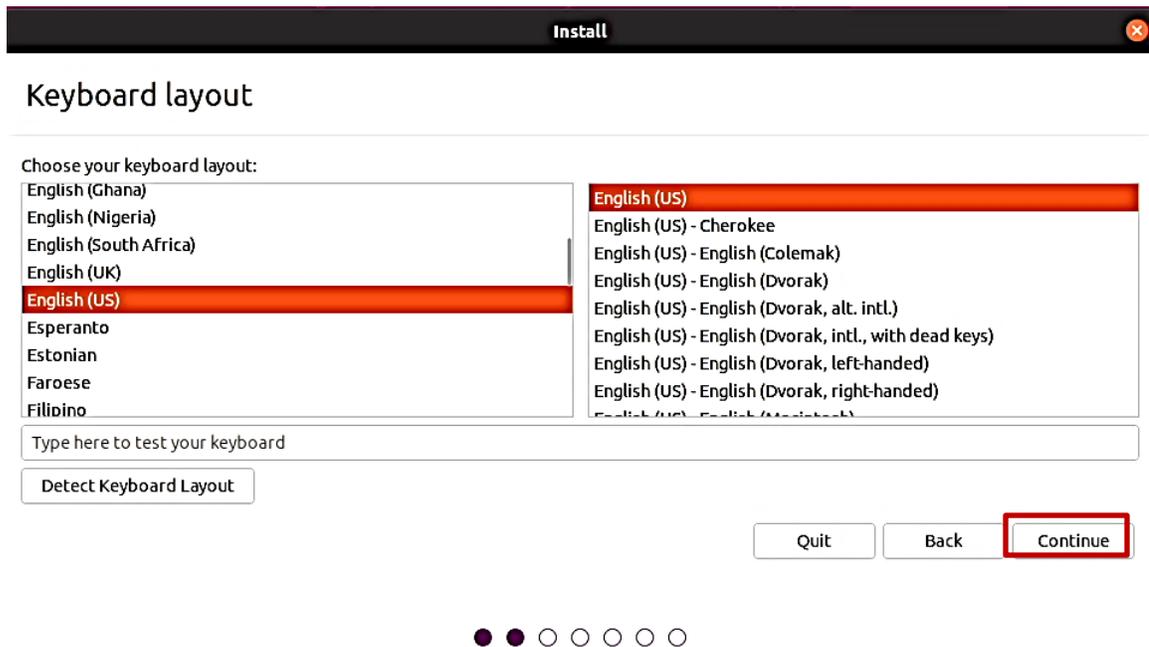
```
BusyBox v1.30.1 (Ubuntu 1:1.30.1-4ubuntu6) built-in shell (ash)
Enter 'help' for a list of built-in commands.

(initramfs) mount -t vfat /dev/sdb1 /tmp
(initramfs) cp -ap /tmp/dd /
(initramfs) /dd/pre_install
Symbolically linking: /sbin/insmod
(initramfs)
(initramfs) umount /tmp
(initramfs) exit
```

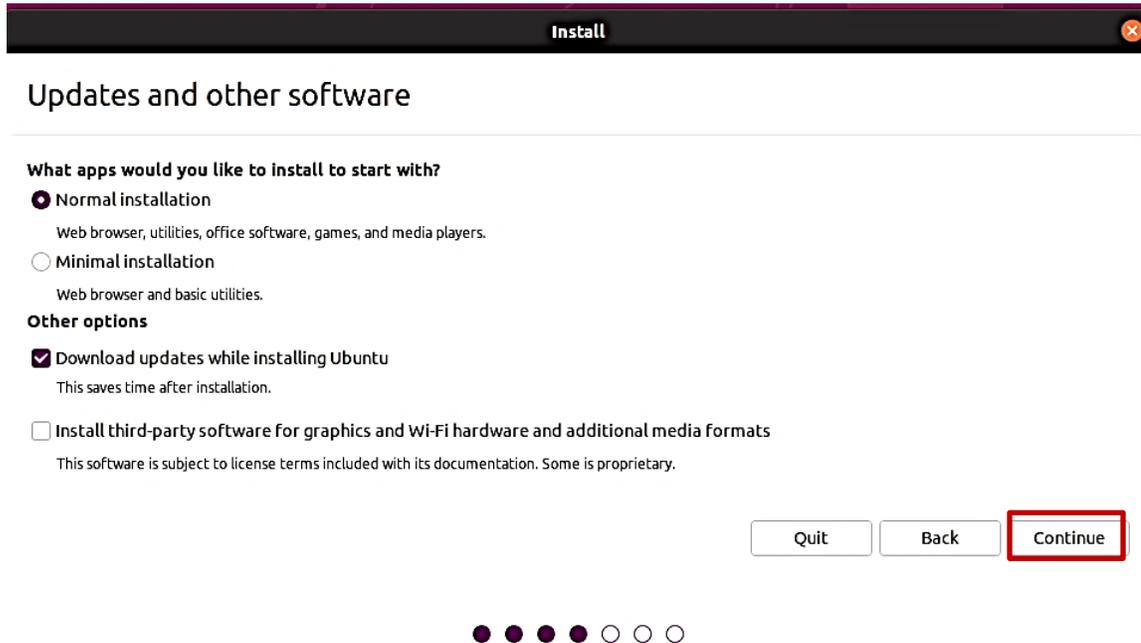
- The Ubuntu Linux Welcome Screen should appear. Select the appropriate language and select “Install Ubuntu”.



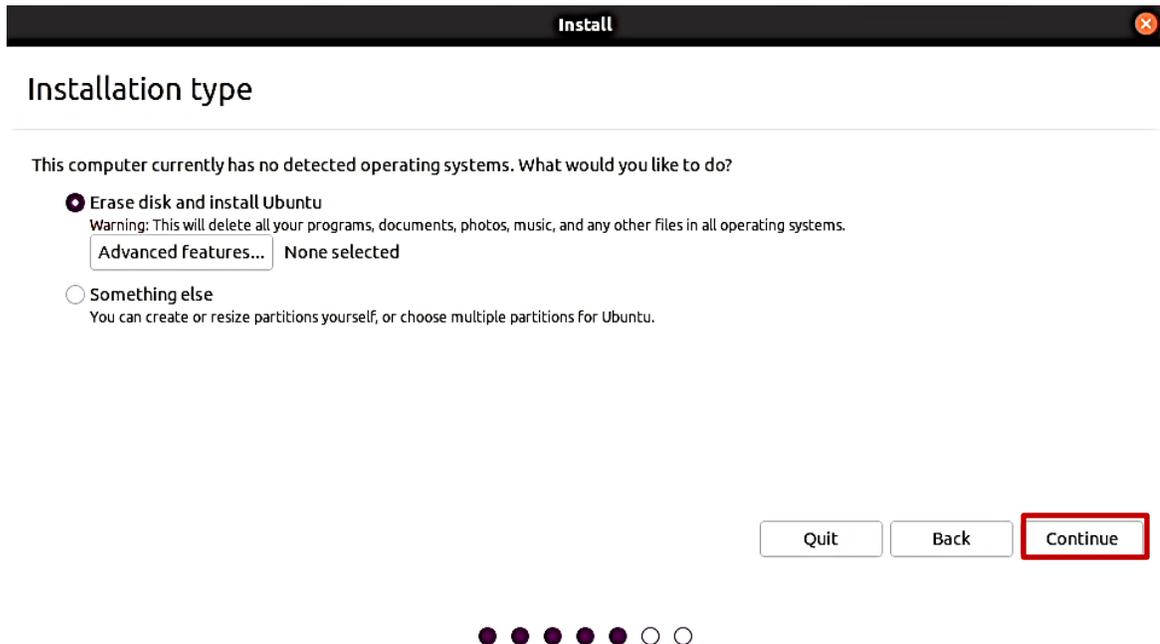
- Select the appropriate keyboard layout and “Continue”.



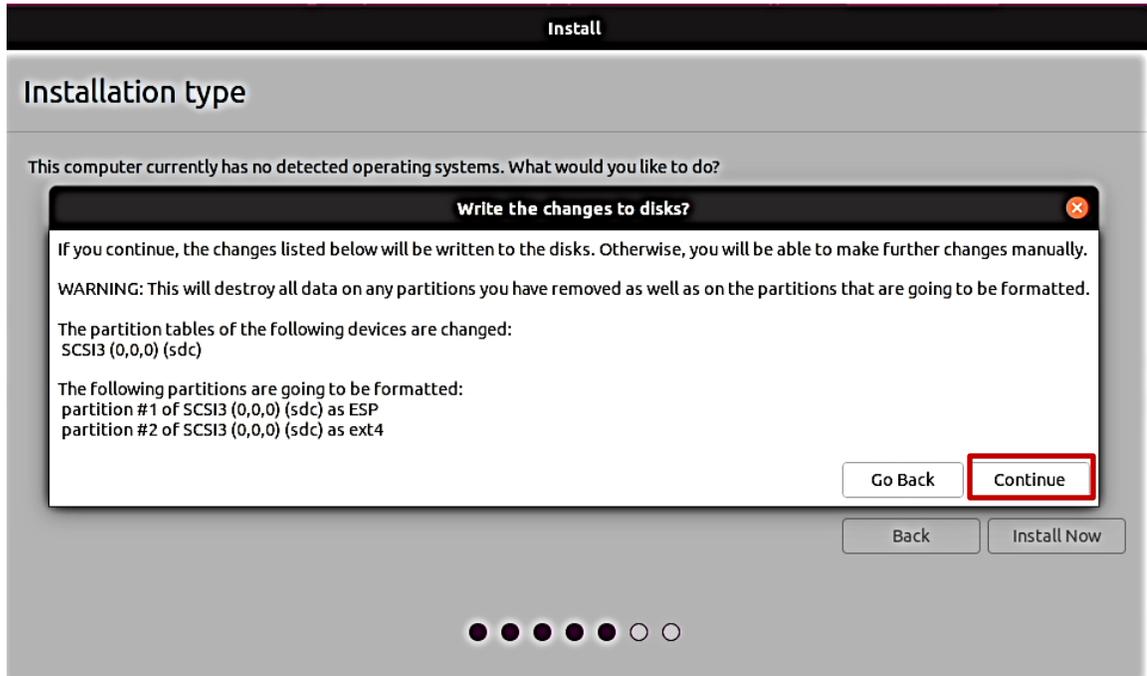
- Select the type of installation and whether or not to install updates and “Continue”.



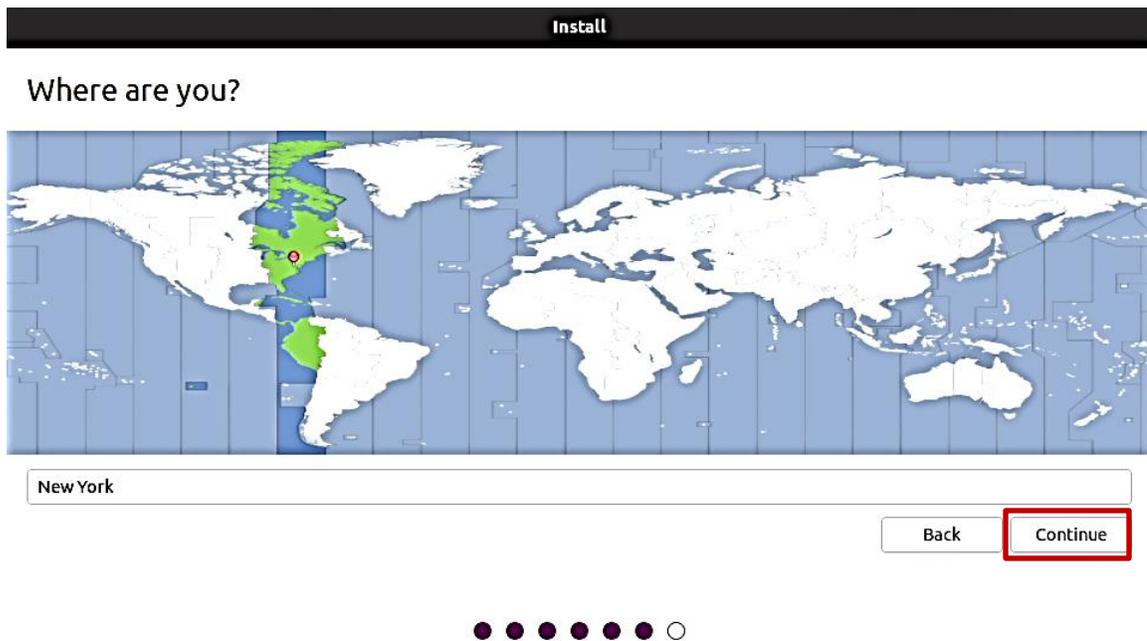
- Select “Erase disk and install Ubuntu” to automatically create the filesystem partitions and “Continue”.



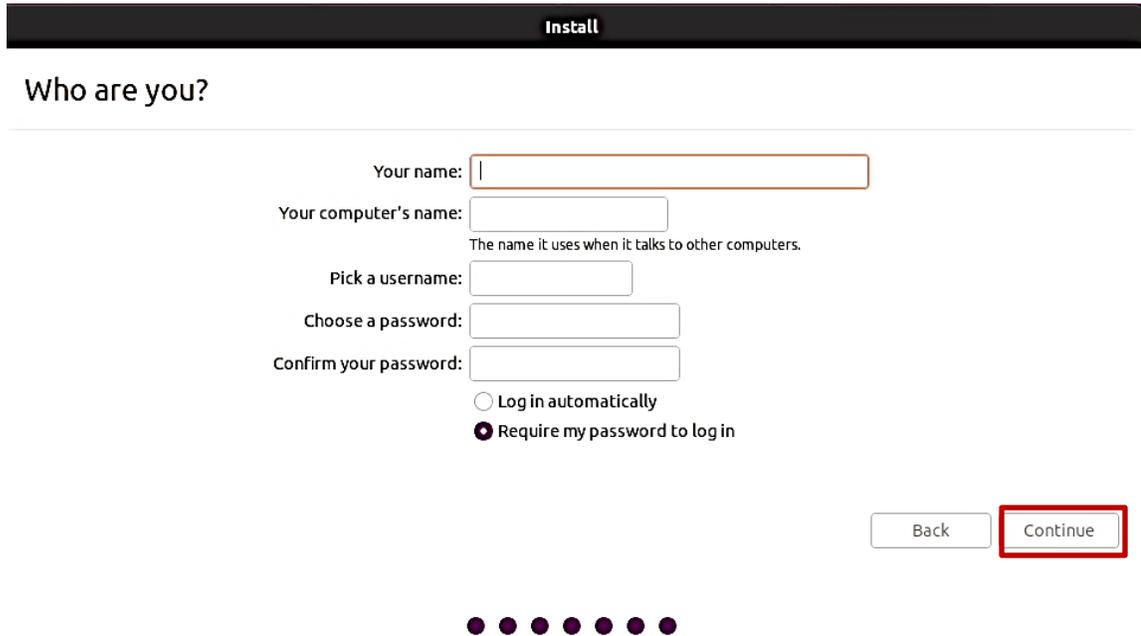
- Select “Continue” to confirm writing changes to the disk.



- Select the appropriate geographical location and “Continue”.

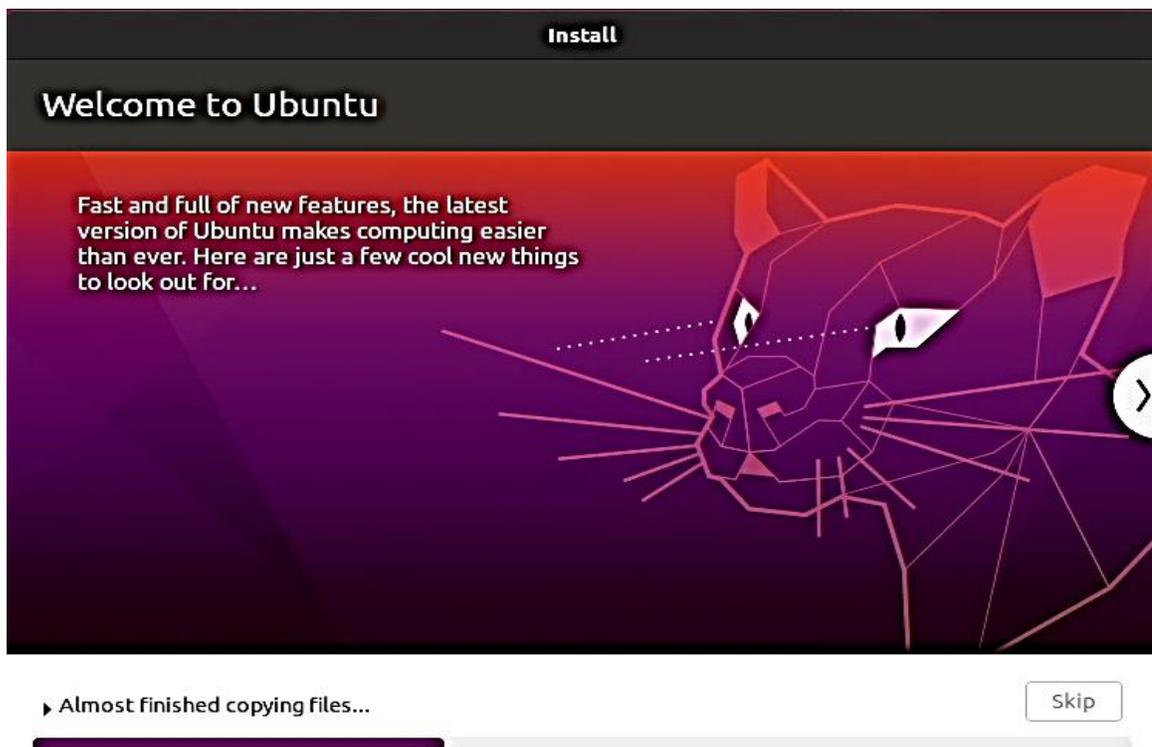


- Fill in the appropriate boxes below and select “Continue”.

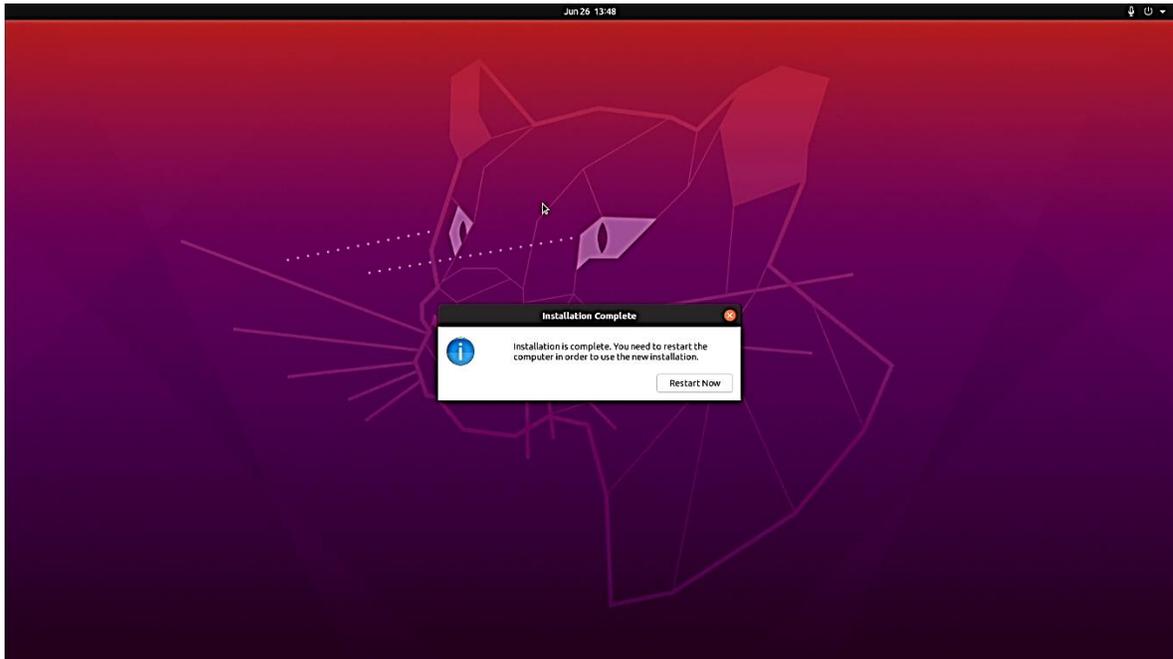


The screenshot shows the 'Who are you?' step of the Ubuntu installation process. At the top, a black bar contains the word 'Install' in white. Below this, the text 'Who are you?' is displayed. The form includes several input fields: 'Your name:' with a text box, 'Your computer's name:' with a text box and a sub-label 'The name it uses when it talks to other computers.', 'Pick a username:' with a text box, 'Choose a password:' with a text box, and 'Confirm your password:' with a text box. Below these fields are two radio button options: 'Log in automatically' (unselected) and 'Require my password to log in' (selected). At the bottom right, there are two buttons: 'Back' and 'Continue', with the 'Continue' button highlighted by a red border. At the bottom center, there is a progress indicator consisting of seven black dots, with the first one being larger than the others.

- Let the system finish the installation.



- At the “Installation Complete” window, press CTRL+ALT+F2.



- At the Ubuntu Login prompt, login using the username ubuntu and no password.

```

Ubuntu 20.04 LTS ubuntu tty2
ubuntu login: ubuntu
Welcome to Ubuntu 20.04 LTS (GNU/Linux 5.4.0-26-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

Your Hardware Enablement Stack (HWE) is supported until April 2025.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

ubuntu@ubuntu:~$ _

```

- Insert the USB flash drive with the Linux AMD RAID driver into a USB port of the system and mount it using the following command:

*“sudo mount -t vfat /dev/sdb1 /mnt”*

**Note:** */dev/sdb1* may need to be changed depending on the number of devices attached to the system.

```
ubuntu@ubuntu:~$ sudo mount -t vfat /dev/sdb1 /mnt_
```

- Copy the contents of the driver to the root directory using the following command:

*“sudo cp -ap /mnt/dd /”*

```
ubuntu@ubuntu:~$ sudo mount -t vfat /dev/sdb1 /mnt
ubuntu@ubuntu:~$ sudo cp -ap /mnt/dd /
ubuntu@ubuntu:~$
```

- Install the driver by running the following command:

*“sudo /dd/post\_install”*

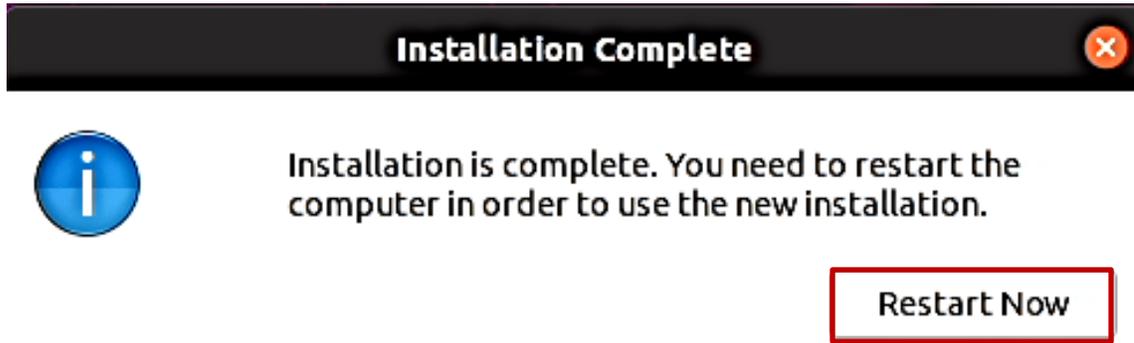
```
ubuntu@ubuntu:~$ sudo mount -t vfat /dev/sdb1 /mnt
ubuntu@ubuntu:~$ sudo cp -ap /mnt/dd /
ubuntu@ubuntu:~$ sudo /dd/post_install
```

- Unmount and remove the USB flash drive by running the following command:

*“sudo umount /mnt”*

- Press CTRL+ALT+F1 to get back to the graphical interface.

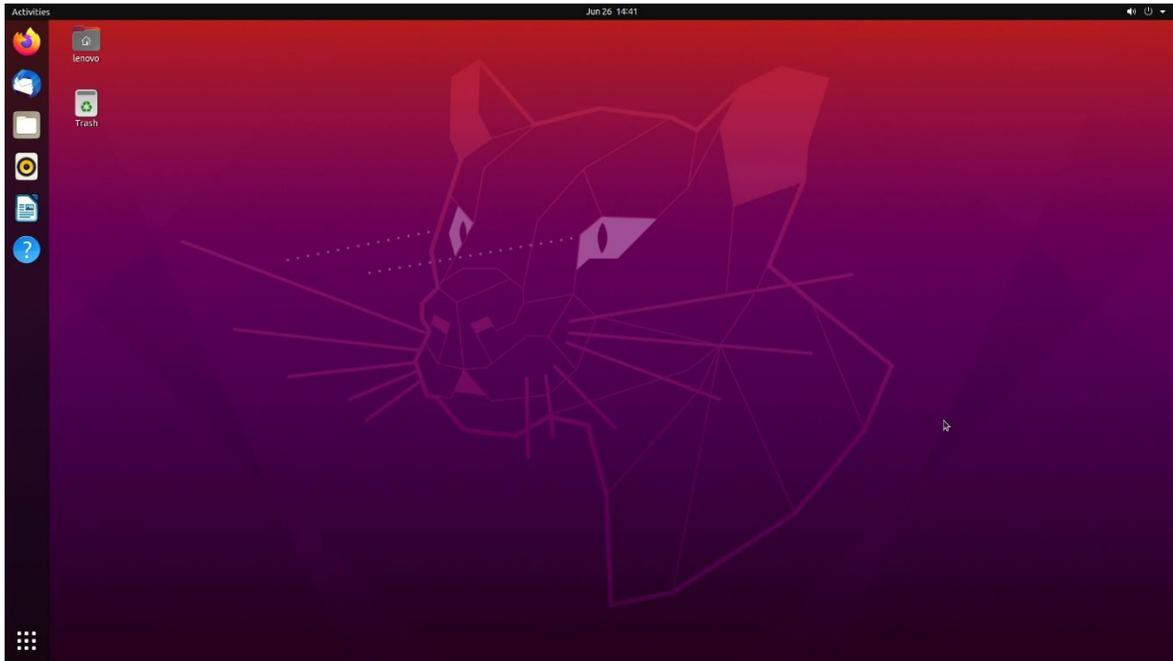
- Once the installation completes, select “Reboot Now”.



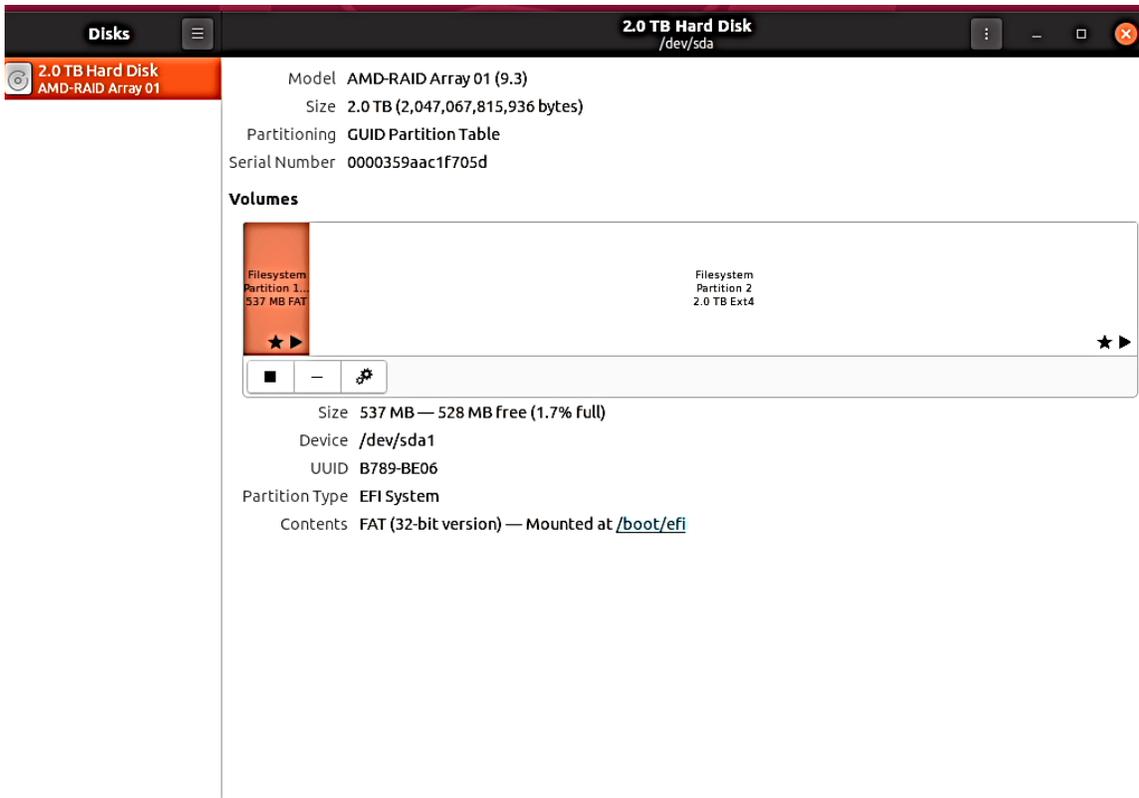
- Remove the installation media (USB/DVD) and press ENTER.



- Ubuntu Linux 20.04 LTS Desktop screen.



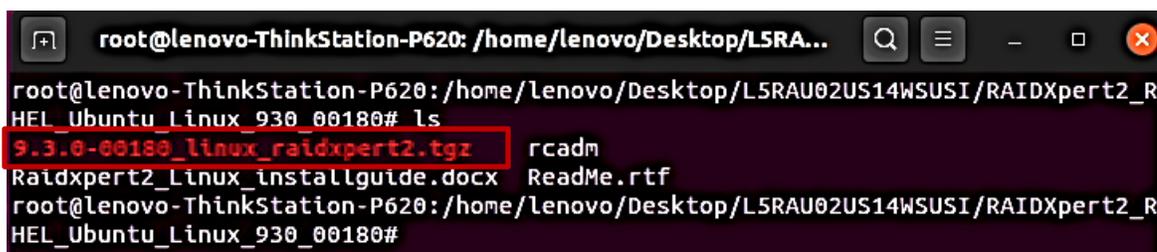
- Disk Configuration Utility.



## Section 4 – RAIDXpert2 Management Application

*Optional:* AMD has a RAIDXpert2 Management Application for AMD RAID arrays. Please refer to the following instructions and screenshots on how to install this AMD management utility on the Lenovo ThinkStation P620.

- Download the Linux AMD RAIDXpert2 Management Application from the Lenovo support site directly onto the Linux desktop.
- Open a terminal window from within the Linux desktop and browse to the correct location path for the driver package.

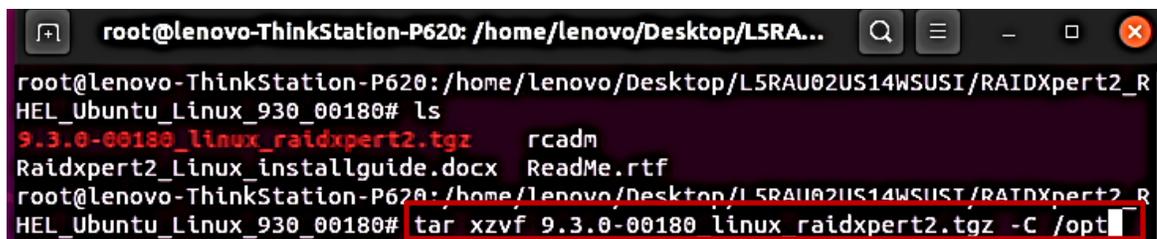


```

root@lenovo-ThinkStation-P620: /home/lenovo/Desktop/L5RAU02US14WSUSI/RAIDXpert2_RHEL_Ubuntu_Linux_930_00180# ls
9.3.0-00180_linux_raidxpert2.tgz  rcadm
Raidxpert2_Linux_installguide.docx  ReadMe.rtf
root@lenovo-ThinkStation-P620: /home/lenovo/Desktop/L5RAU02US14WSUSI/RAIDXpert2_RHEL_Ubuntu_Linux_930_00180#
  
```

- Extract the contents of the \*.tgz file using the following command:

*“tar xzvf 9.3.0-00180\_linux\_raidxpert2.tgz -C /opt”*

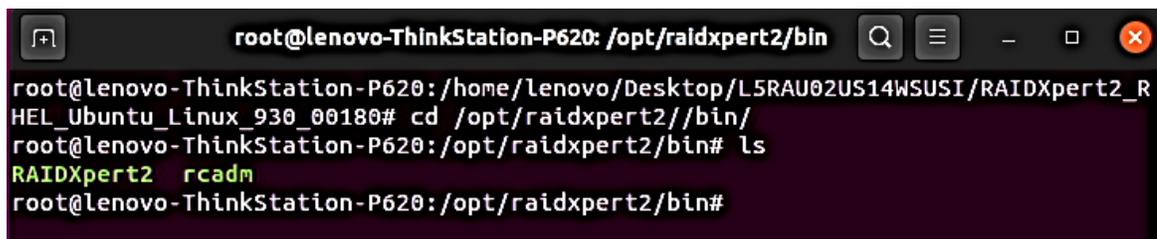


```

root@lenovo-ThinkStation-P620: /home/lenovo/Desktop/L5RAU02US14WSUSI/RAIDXpert2_RHEL_Ubuntu_Linux_930_00180# ls
9.3.0-00180_linux_raidxpert2.tgz  rcadm
Raidxpert2_Linux_installguide.docx  ReadMe.rtf
root@lenovo-ThinkStation-P620: /home/lenovo/Desktop/L5RAU02US14WSUSI/RAIDXpert2_RHEL_Ubuntu_Linux_930_00180# tar xzvf 9.3.0-00180_linux_raidxpert2.tgz -C /opt
  
```

- Change directory path to where the package was extracted to from above:

*“cd /opt/raidxpert2/bin”*



```

root@lenovo-ThinkStation-P620: /opt/raidxpert2/bin
root@lenovo-ThinkStation-P620: /home/lenovo/Desktop/L5RAU02US14WSUSI/RAIDXpert2_RHEL_Ubuntu_Linux_930_00180# cd /opt/raidxpert2/bin/
root@lenovo-ThinkStation-P620: /opt/raidxpert2/bin# ls
RAIDXpert2  rcadm
root@lenovo-ThinkStation-P620: /opt/raidxpert2/bin#
  
```

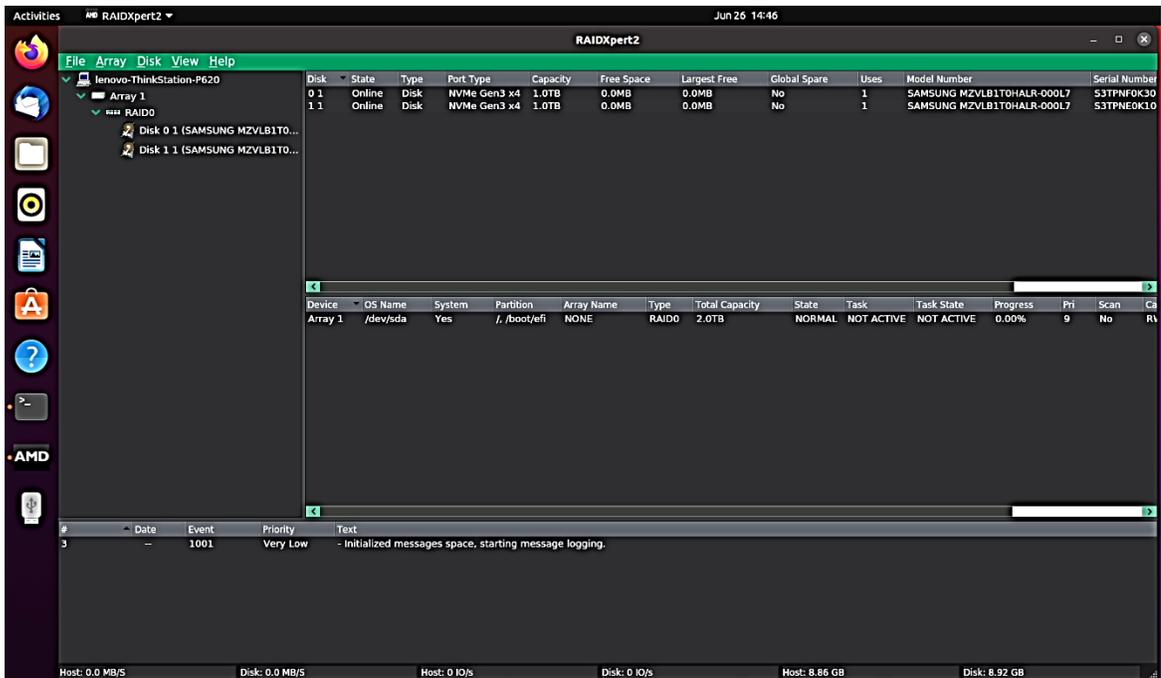
- To launch the AMD RAIDXpert2 Management Application, run the following command:

`./RAIDXpert2 &`

```

root@lenovo-ThinkStation-P620: /opt/raidxpert2/bin
root@lenovo-ThinkStation-P620:/home/lenovo/Desktop/L5RAU02US14WSUSI/RAIDXpert2_RHEL_Ubuntu_Linux_930_00180# cd /opt/raidxpert2//bin/
root@lenovo-ThinkStation-P620:/opt/raidxpert2/bin# ls
RAIDXpert2  rcadm
root@lenovo-ThinkStation-P620:/opt/raidxpert2/bin# ./RAIDXpert2 &
  
```

- RAIDXpert2 Management Application



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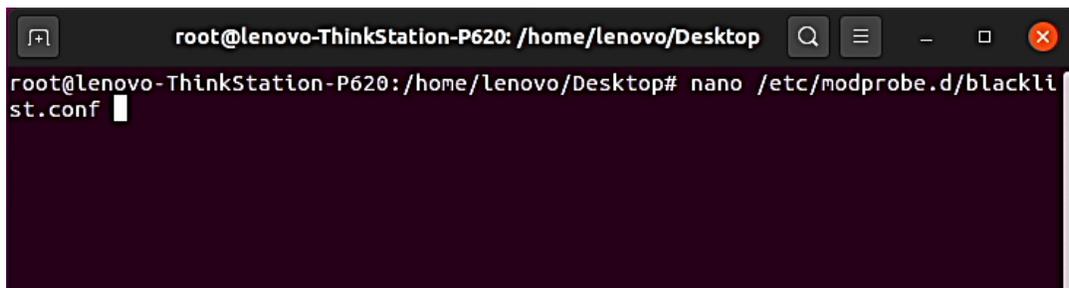
## Section 5 – Installing the Nvidia Graphics Driver

In order to get optimal performance out of the Nvidia GPU, it is a good idea to install the proprietary Nvidia graphics driver. Follow the instructions below to do so.

- Download the latest Nvidia graphics driver for the appropriate Nvidia GPU from [here](#).
- Blacklist the Linux Nouveau driver by following the steps below:
  - From within Linux, open a terminal window and log in as root.  

```
# sudo su -
```
  - Using a text editor, create and modify the following file  
`/etc/modprobe.d/blacklist.conf`  

```
# vi /etc/modprobe.d/blacklist.conf
```



```
root@lenovo-ThinkStation-P620: /home/lenovo/Desktop
root@lenovo-ThinkStation-P620:/home/lenovo/Desktop# nano /etc/modprobe.d/blacklist.conf
```

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

```

root@lenovo-ThinkStation-P620: /home/lenovo/Desktop
GNU nano 4.8 /etc/modprobe.d/blacklist.conf Modified
# 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

# ugly and loud noise, getting on everyone's nerves; this should be done by a
# nice pulseaudio bing (Ubuntu: #77010)
blacklist pcspr

# 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

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Paste Text ^T To Spell ^_ Go To Line

```

- Run the following command to update the initramfs file.

```
# update-initramfs -u
```

```

root@lenovo-ThinkStation-P620: /home/lenovo/Desktop
root@lenovo-ThinkStation-P620:/home/lenovo/Desktop# nano /etc/modprobe.d/blacklist.conf

```

- Reboot the system.

- Open a terminal window from within the Linux desktop, log in as root, and execute the command “init 3”.

```

root@lenovo-ThinkStation-P620: /home/lenovo/Desktop
lenovo@lenovo-ThinkStation-P620:~/Desktop$ sudo su
[sudo] password for lenovo:
root@lenovo-ThinkStation-P620:/home/lenovo/Desktop# init 3

```

- Install all prerequisites using the following commands:

# apt-get install 'build-essential'

```

root@lenovo-ThinkStation-P620:/home/lenovo/Downloads# apt-get install 'build-essential'
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  linux-modules-5.4.0-1002-oem
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu cpp-9 dpkg-dev fakeroot g++ g++-9 gcc gcc-9
  libc6 libc6-dbg libc6-dev libcc1-0 libcrypt-dev libctf-nobfd0 libctf0 libdpkg-perl libfakeroot
Suggested packages:
  binutils-doc gcc-9-locales debian-keyring g++-multilib g++-9-multilib gcc-9-doc gcc-multilib
The following NEW packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu build-essential dpkg-dev fakeroot g++ g++-9
  libcrypt-dev libctf-nobfd0 libctf0 libfakeroot libgcc-9-dev libitm1 liblsan0 libquadmath0
The following packages will be upgraded:
  cpp-9 gcc-10-base gcc-9-base libc6 libc6-dbg libcc1-0 libdpkg-perl libgcc-s1 libgomp1 libstdc++6
10 upgraded, 32 newly installed, 0 to remove and 397 not upgraded.
Need to get 31.3 MB/48.2 MB of archives.
After this operation, 143 MB of additional disk space will be used.
Do you want to continue? [Y/n]

```

Press “Y” to continue.

- Log in as root, change directory path to the download directory to where the Nvidia driver was downloaded.

```

[ lenovo@lenovo-ThinkStation-P620 ~ ]$ cd /home/lenovo/Downloads/
[ lenovo@lenovo-ThinkStation-P620 Downloads]$ ls
NVIDIA-Linux-x86_64-440.82.run
[ lenovo@lenovo-ThinkStation-P620 Downloads]$

```

- Make the Nvidia driver executable.

```
# chmod +x Nvidia-*
```

```
[lenovo@lenovo-ThinkStation-P620 Downloads]$ chmod +x NVIDIA-Linux-x86_64-440.82.run
[lenovo@lenovo-ThinkStation-P620 Downloads]$ ls
NVIDIA-Linux-x86_64-440.82.run
[lenovo@lenovo-ThinkStation-P620 Downloads]$
```

- Run the driver executable.

```
# ./Nvidia*
```

```
[lenovo@lenovo-ThinkStation-P620 Downloads]$ ./NVIDIA-Linux-x86_64-440.82.run
```

- Select “Continue Installation” and the driver installation should start.

```
NVIDIA Accelerated Graphics Driver

An alternate method of installing the NVIDIA driver was detected. (This is usually a package provided by your distributor
nvidia-installer.

Please review the message provided by the maintainer of this alternate installation method and decide how to proceed:

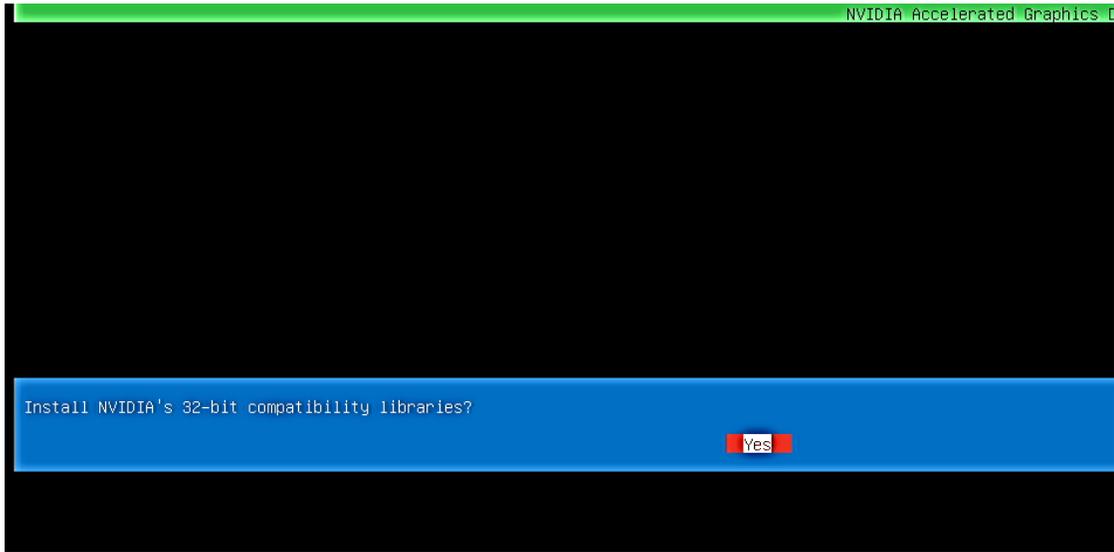
Continue installation

The NVIDIA driver provided by Ubuntu can be installed by launching the "Software & Updates" application, and by selecting
```

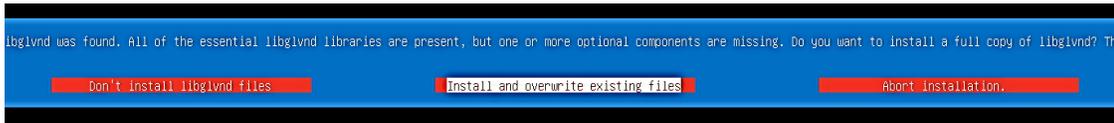
```
NVIDIA Accelerated Graphics Driver for Linux-

Building kernel modules
11%
```

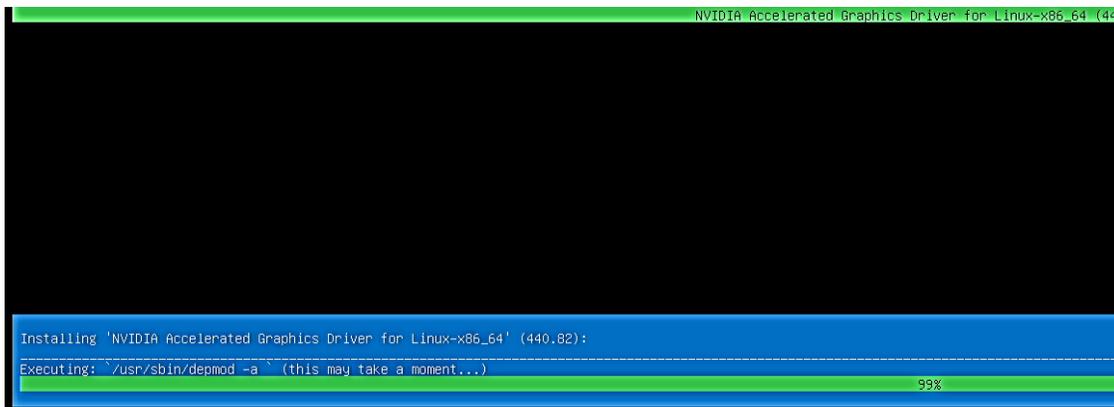
- Select “Yes” to install Nvidia’s 32-bit compatible libraries.



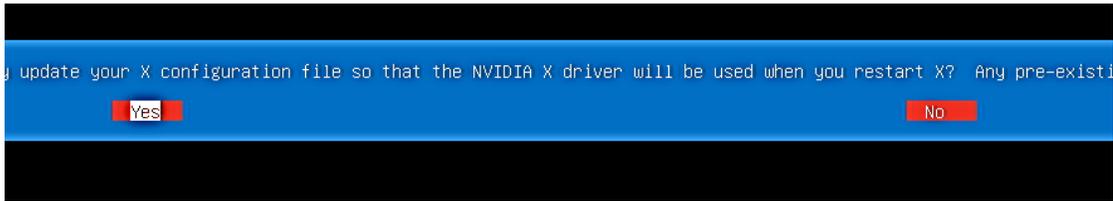
- Select “Install and overwrite existing files”.



- Driver installation continues.



- Select “Yes” update the X configuration file.



- Select “OK” to acknowledge driver installation is complete.



- Execute the following command to verify the Nvidia driver is installed and loaded.

# nvidia-smi

```
[root@lenovo-ThinkStation-P620 Downloads]# nvidia-smi
Wed Jun  3 17:40:26 2020
+-----+
| NVIDIA-SMI 440.82          Driver Version: 440.82          CUDA Version: 10.2   |
+-----+
| GPU   Name           Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf    Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute M. |
+-----+-----+
|  0   Quadro P620      Off      | 00000000:61:00:0 Off |         0MiB / 1991MiB |      2%    Default  |
+-----+-----+
+-----+
| Processes:
| GPU   PID     Type    Process name                        GPU Memory
|-----|-----|-----|-----|-----|
| No running processes found
+-----+
[root@lenovo-ThinkStation-P620 Downloads]#
```

---

## Section 6 – Revision History

Version	Date	Author	Changes/Updates
1.1	4/9/2021	Jason Moebs	Added AMD RAID note
1.0	7/15/2020	Jason Moebs	Initial launch release