

# Ubuntu 20.04 LTS Linux Setup Guide

Thinkpad P15 Gen 2, P17 Gen 2, P1 Gen 4



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## Section 1 – BIOS Setup

The first step prior to installing Linux is to make sure the system BIOS is setup accordingly. Note, there are a couple of things to know prior to installing Linux on the system.

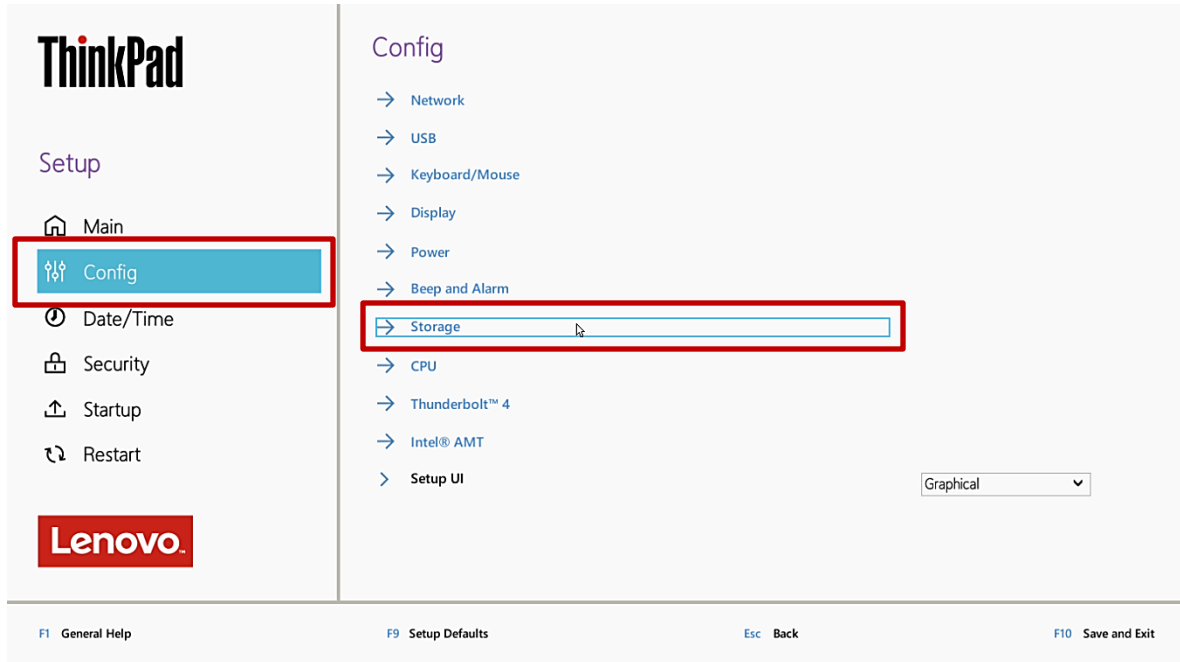
- BIOS RAID mode is not supported using Linux on these systems.
- It is recommended to disable 'Secure Boot' prior to installing Linux.

Follow these steps to ensure BIOS is being configured properly to install Linux.

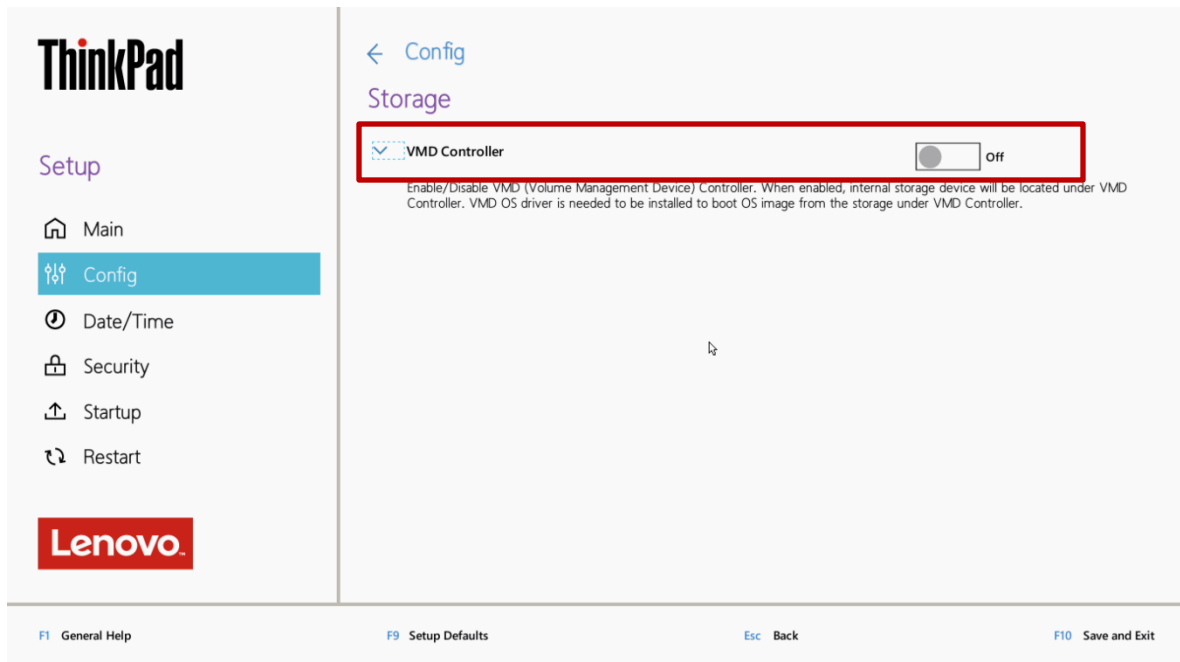
- Boot into BIOS by pressing the function F1 key at the 'Lenovo' splash screen.



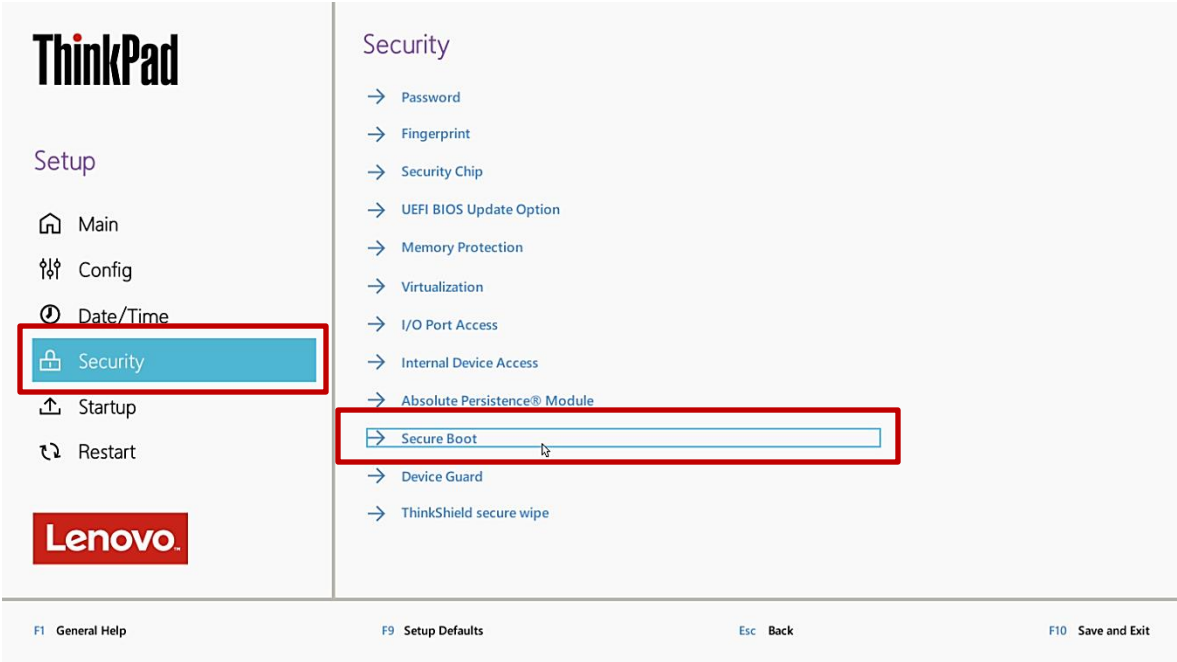
- Select the 'Config' menu tab, followed by the 'Storage' menu option.



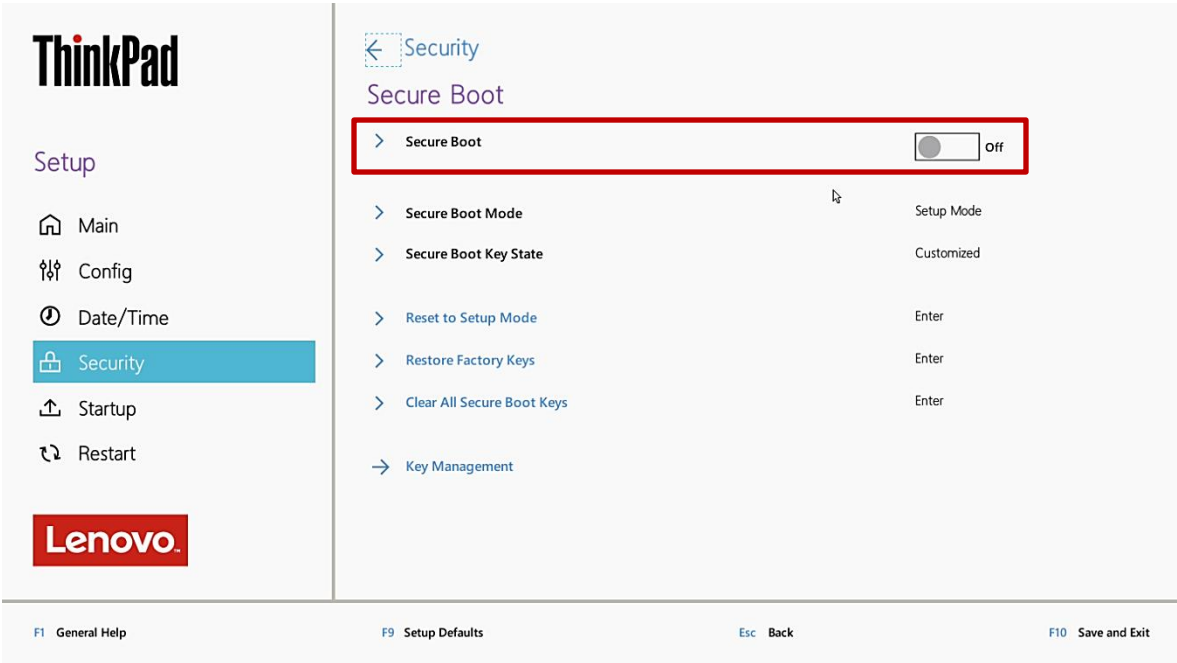
- Make sure the "VMD Controller" is turned 'Off'.



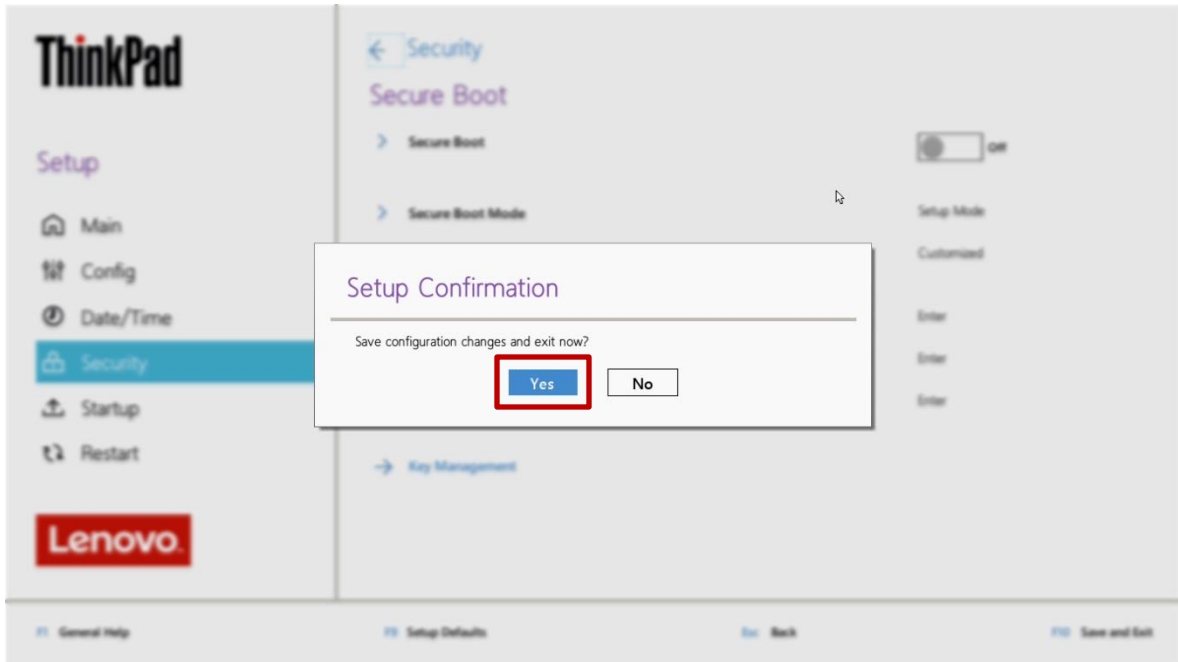
- Select the 'Security' tab, followed by the 'Secure Boot' menu option.



- Turn off the 'Secure Boot' option by selecting the slider option.



- Press function key F10 to save and exit BIOS setup and select 'Yes' to save configuration changes.

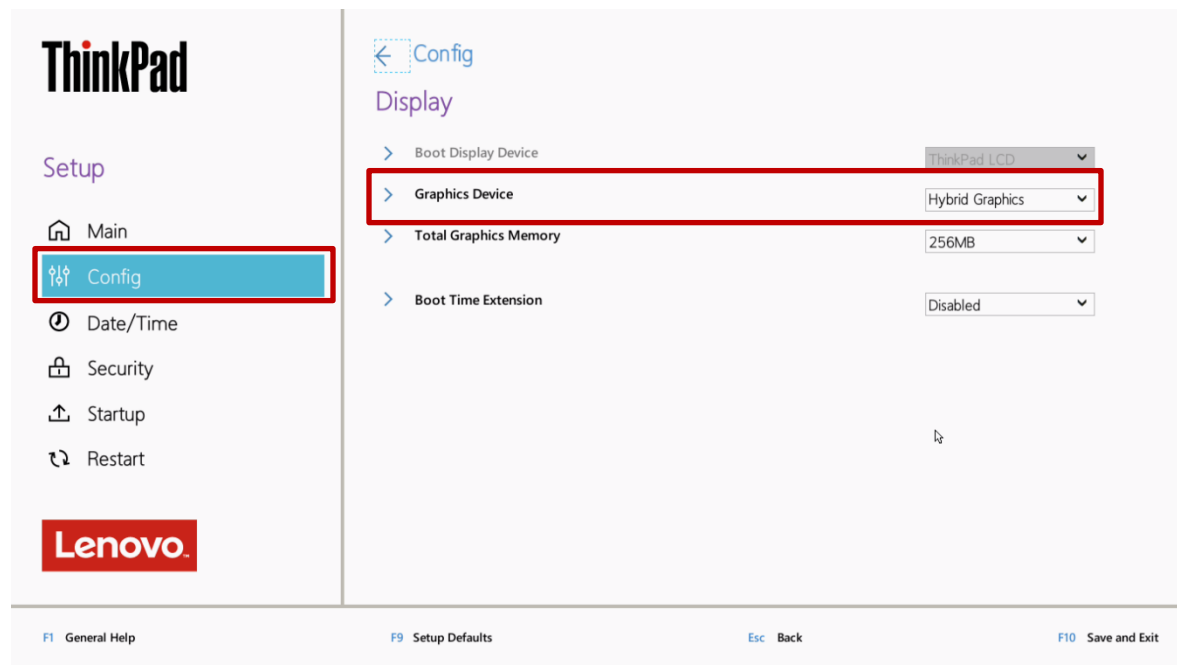


## Section 2 – Discrete vs Hybrid Graphics

The Lenovo Thinkpad P15 Gen 2 and P17 Gen 2 systems offer both Nvidia and Intel graphics. There are a couple of different options within BIOS setup for graphics mode: 'Hybrid' versus 'Discrete'. The default graphics mode for these systems is 'Hybrid' graphics.

- *Hybrid Graphics mode* – utilizes the integrated Intel graphics as the primary graphics to achieve longer battery life and enables discrete graphics on demand.
- *Discrete Graphics mode* – utilizes only the discrete GPU to achieve higher graphics performance.

Note, the graphics mode can be changed from within BIOS setup, selecting the 'Config' option, selecting the 'Display' menu option under the 'Config' menu, and changing the 'Graphics Device' dropdown menu from either "Hybrid Graphics" or "Discrete Graphics".



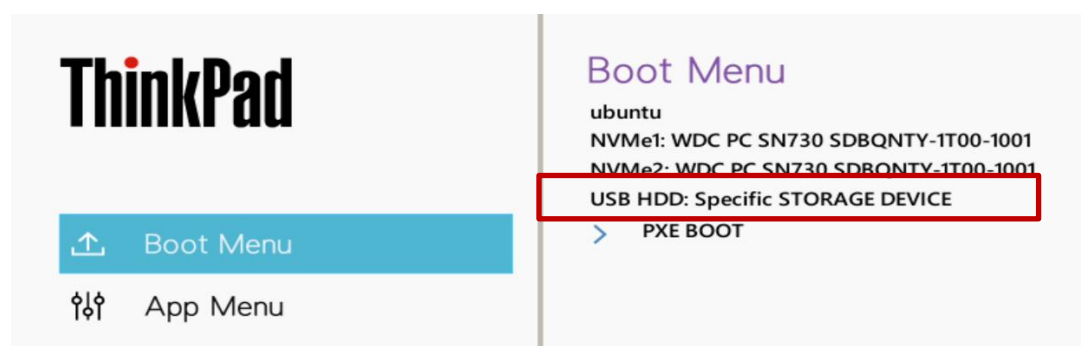
## Section 3 – Installing Ubuntu 20.04 LTS

Please refer to the following instructions and screenshots on how to install Ubuntu 20.04 LTS on the Lenovo Thinkpad P15 Gen 2 and P17 Gen 2.

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



- Select the Linux bootable installation media from the F12 boot menu list.

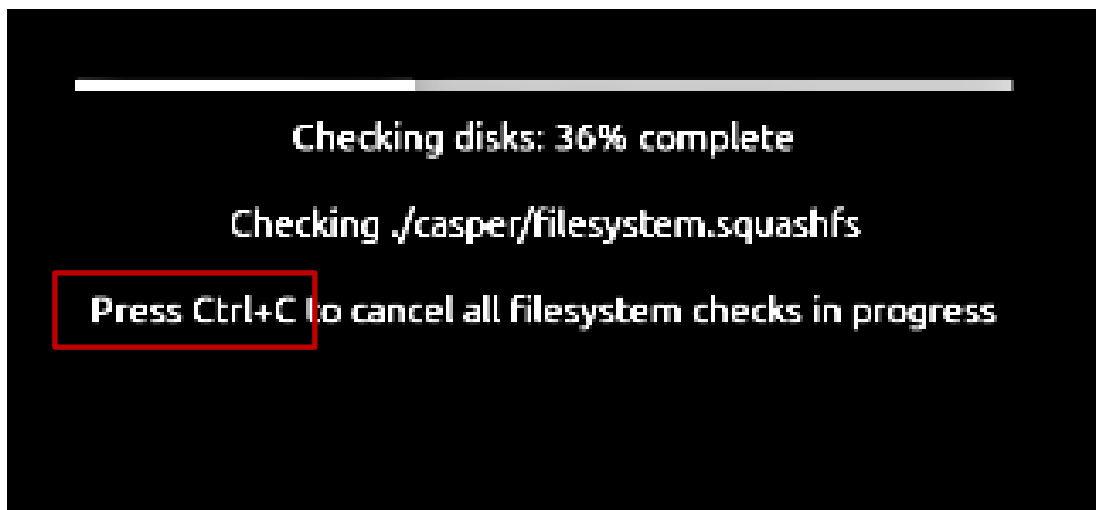




- Highlight 'Ubuntu' from the GRUB boot menu and press 'enter'.



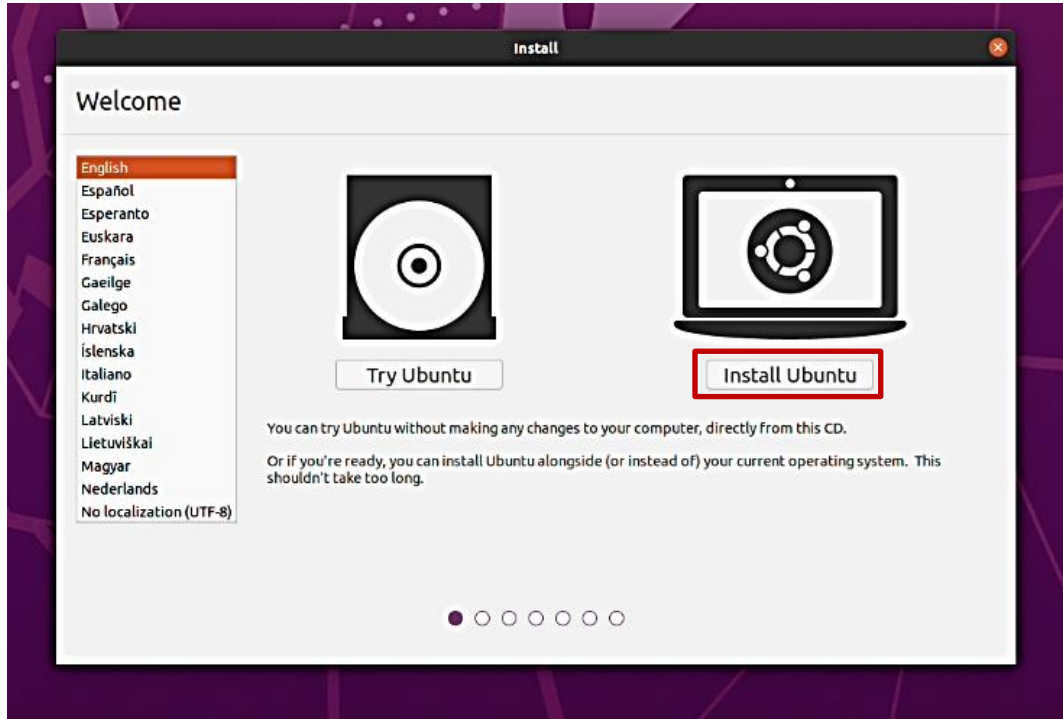
- The system may check the Ubuntu installation media for disk errors. Pressing 'CTRL + C' will skip disk checking.



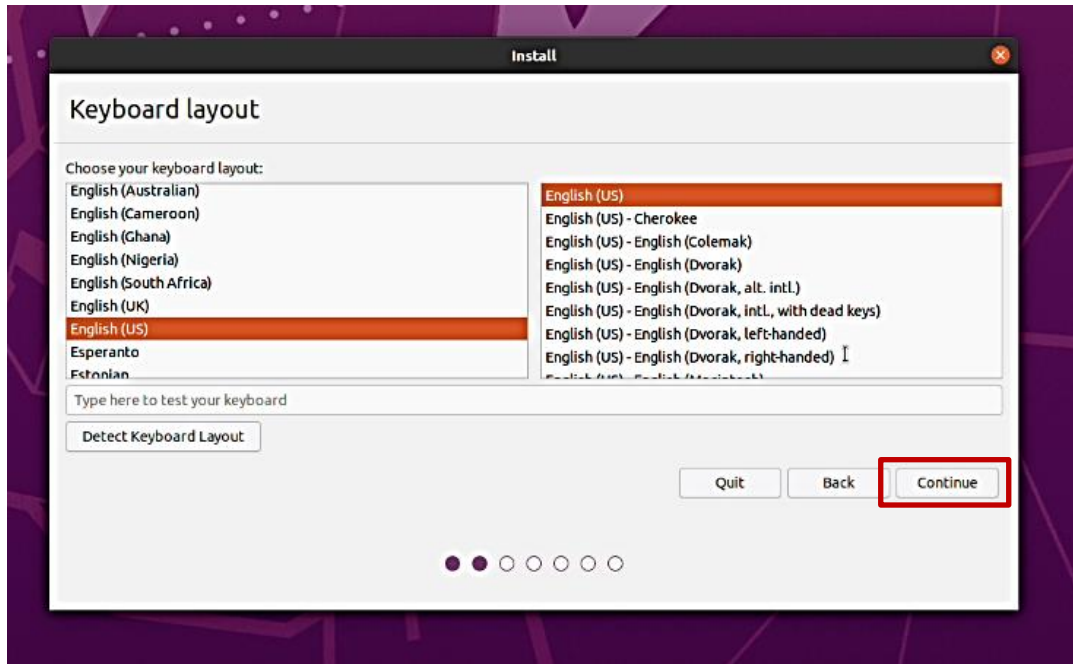
- The Ubuntu installation will begin to load.



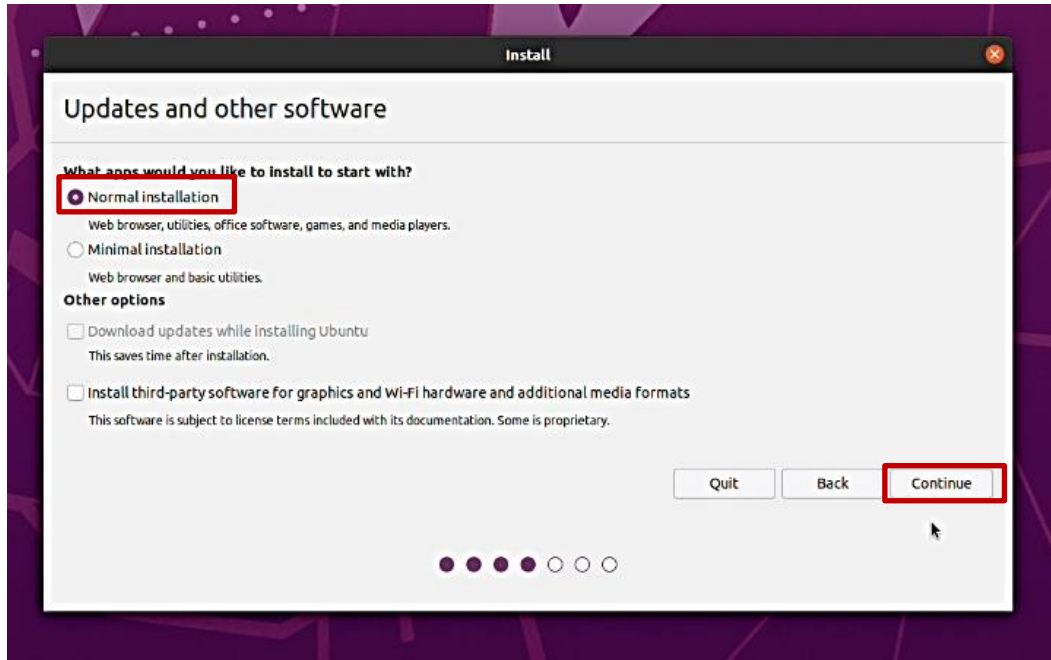
- The Ubuntu Linux Welcome Screen should appear. Click “Install Ubuntu” to proceed.



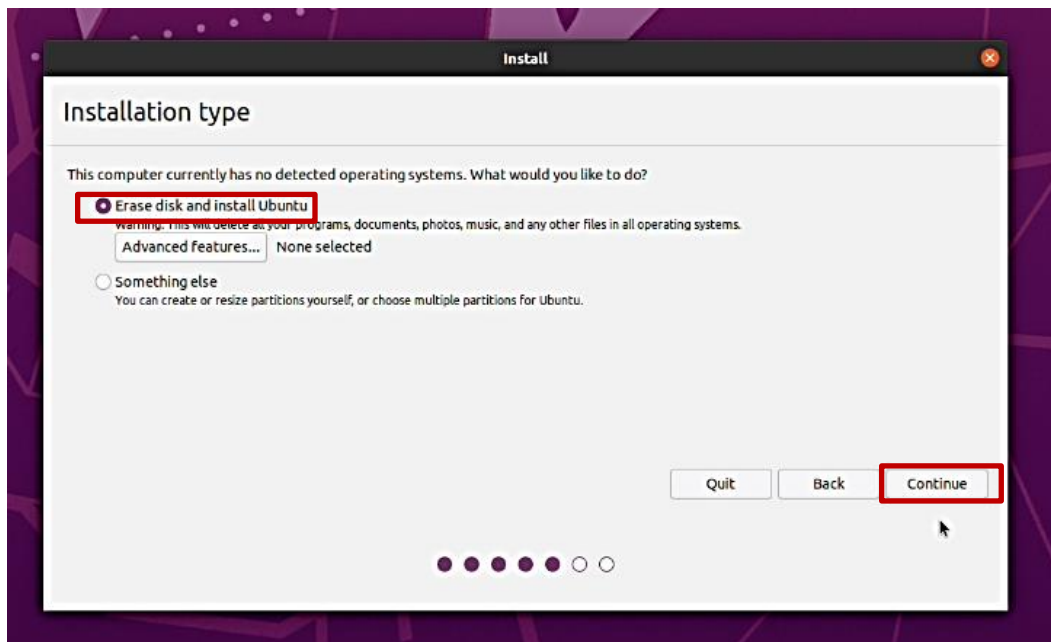
- Select the appropriate keyboard layout and language and ‘Continue’.



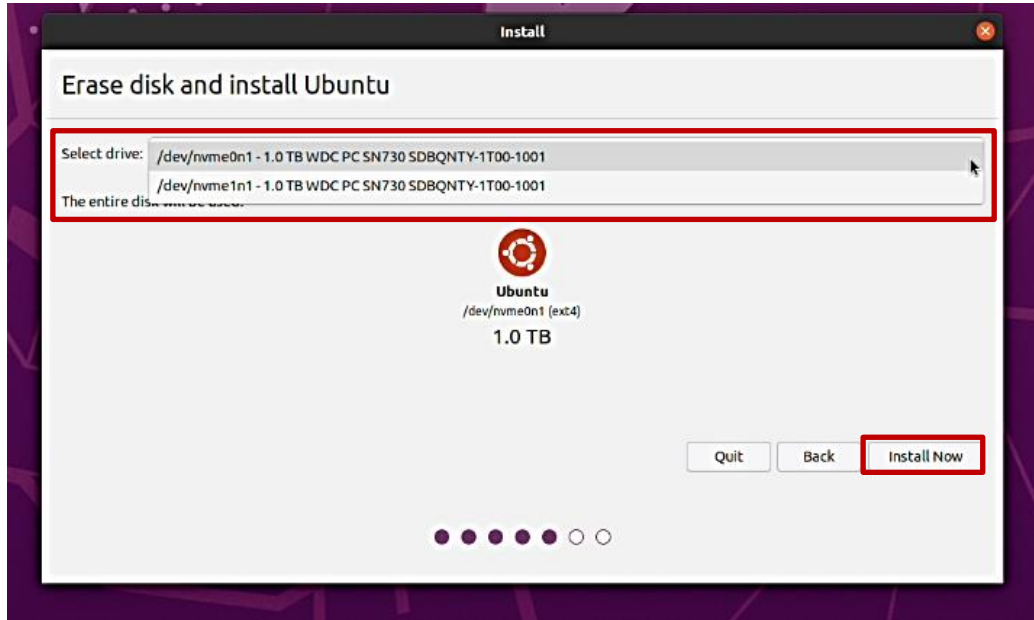
- Select 'Normal Installation' and 'Continue'.



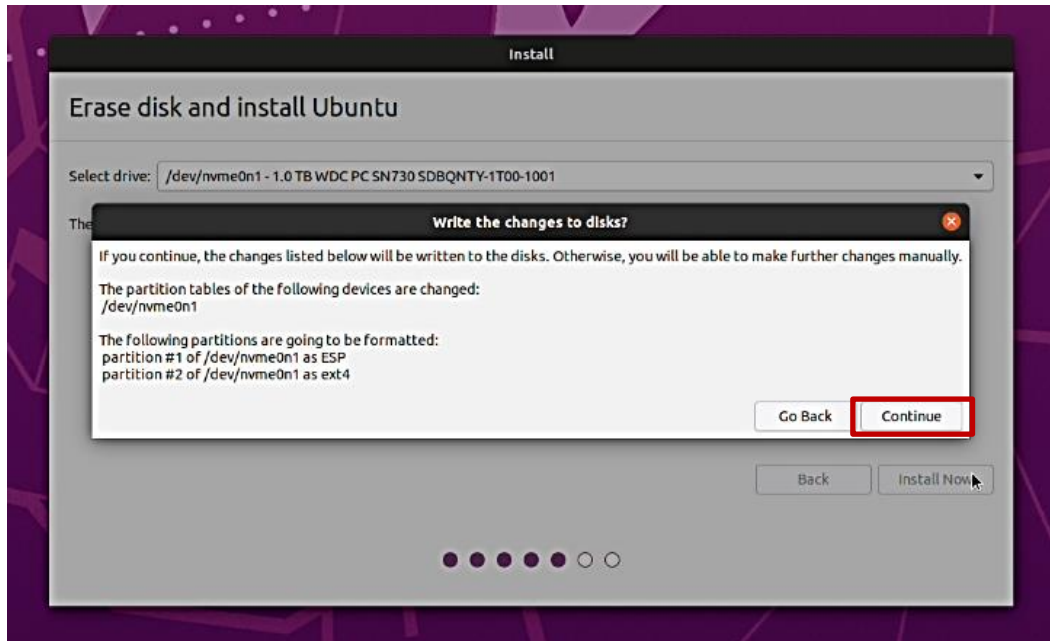
- Select the installation type. For simplicity, this guide was done using 'Erase disk and install Ubuntu'.



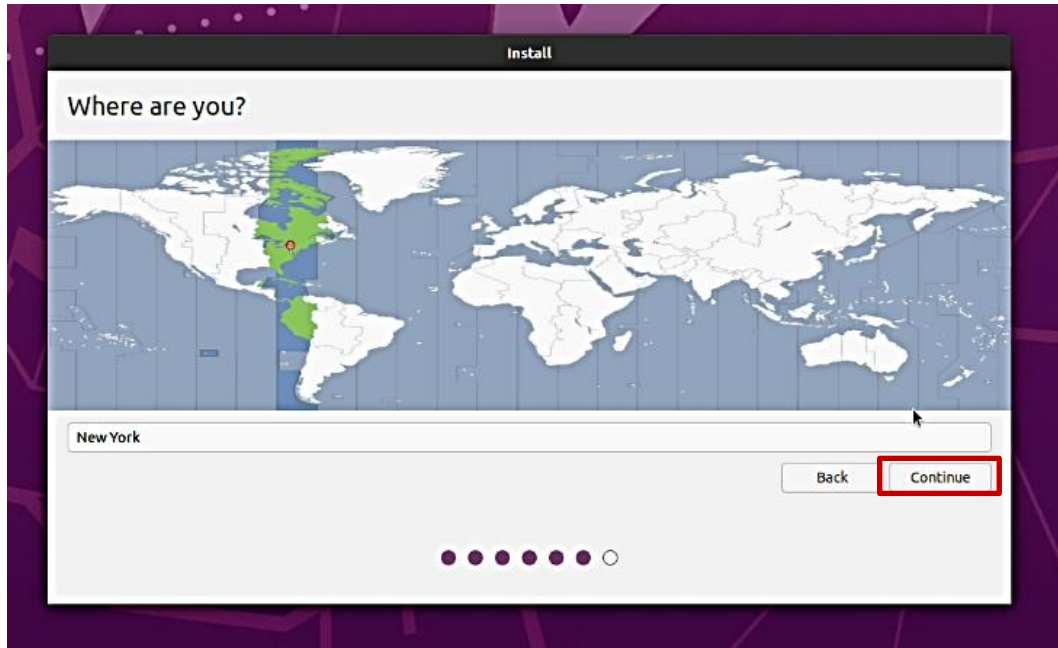
- With multiple drives installed in the system, the Ubuntu installer will likely prompt the user to select which drive to install the operating system. Select one of the drives from the dropdown menu and 'Install Now'.



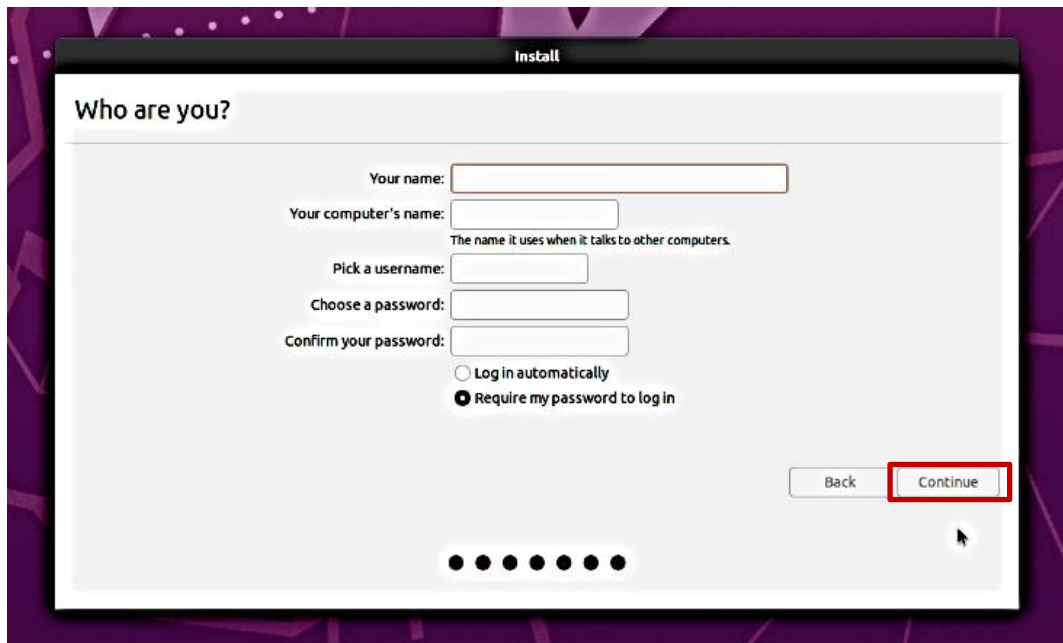
- Select 'Continue' to confirm changes will be made to the disk.



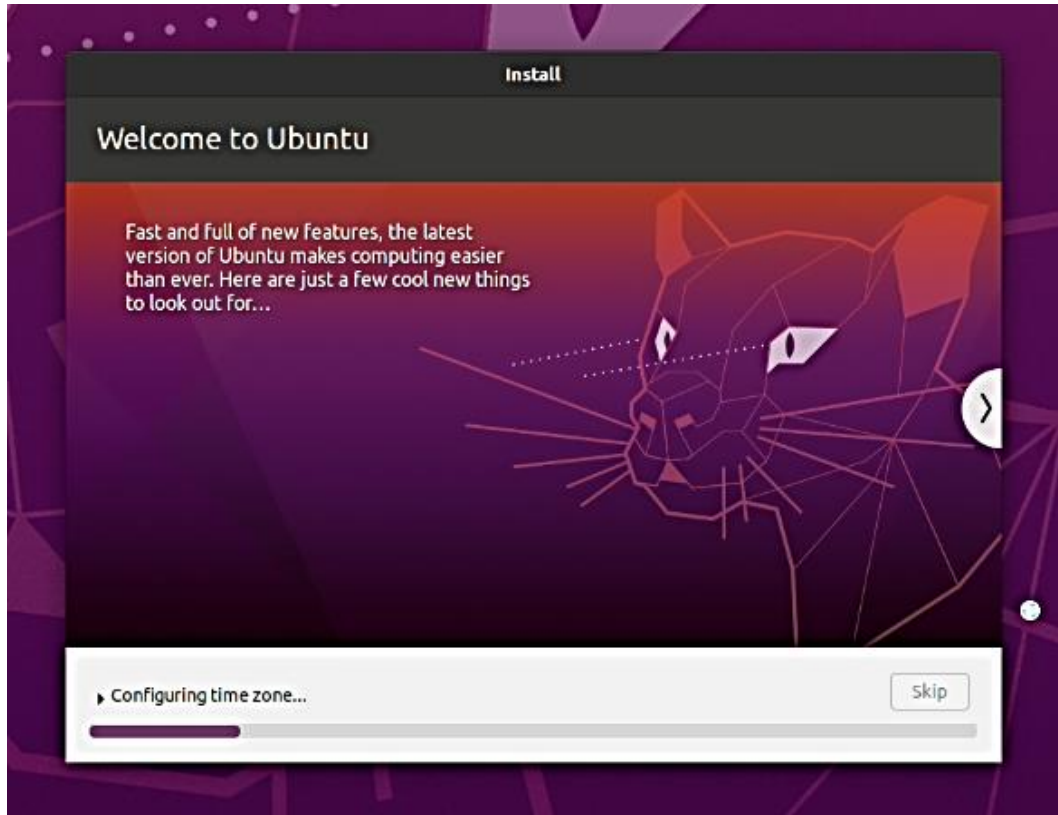
- Select the appropriate geographical location and 'Continue'.



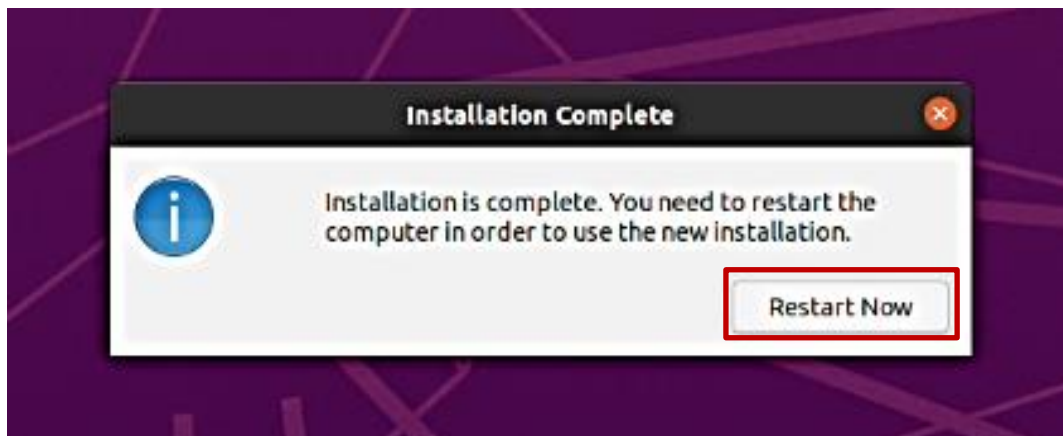
- Fill out the appropriate information and select 'Continue'.



- Ubuntu installation progress bar will be shown.



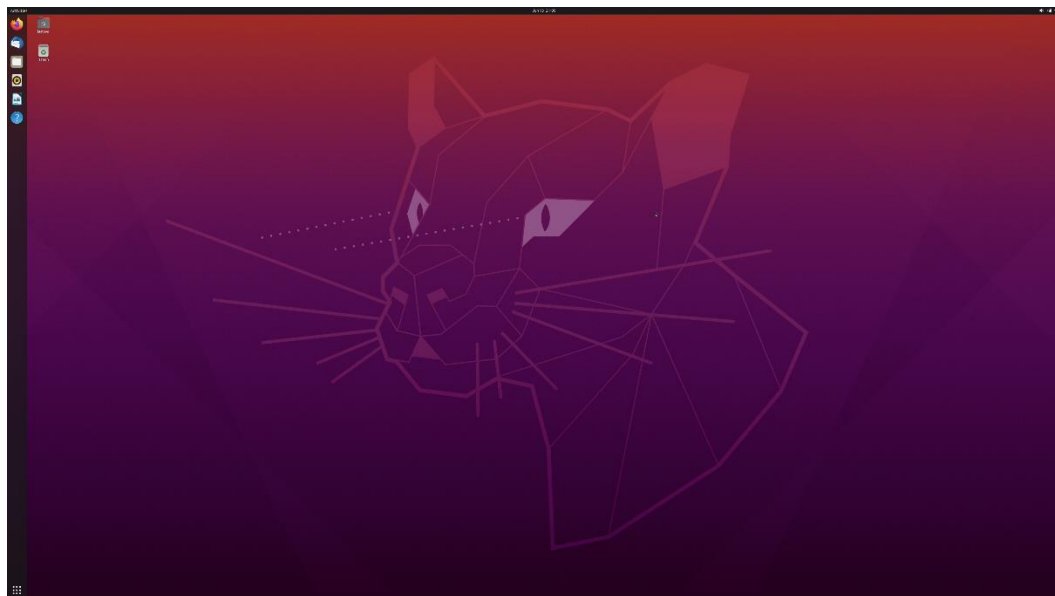
- Once the installation completes, select 'Restart Now'.



- Remove the installation media and press 'Enter'.



- Ubuntu Desktop Screen.



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## Section 4 – Installing the Wifi Driver

In order to get the wireless networking adapter to adequately function properly, Lenovo recommends updating to the Linux OEM kernel. To do so, simply run the following Linux commands with superuser (root) privileges.

```
# sudo apt-get install linux-image-oem-20.04
# sudo apt-get install linux-headers-oem-20.04
# reboot
```

Also, it's important to make sure the Linux drivers are installed for the appropriate wireless adapter used in the system. Follow these steps below to add the appropriate Linux wireless drivers to the system.

1. Download the latest Linux driver from Intel's website:  
[https://wireless.wiki.kernel.org/\\_media/en/users/drivers/iwlwifi-ty-59.601f3a66.0.tgz](https://wireless.wiki.kernel.org/_media/en/users/drivers/iwlwifi-ty-59.601f3a66.0.tgz)

2. Extract the \*.tgz file by executing the following command:

```
# tar zxf iwlwifi-ty-59.601f3a66.0.tgz
```

3. Copy over the \*.ucode file from the extracted directory to the /lib/firmware directory on the system.

```
# cp iwlwifi-ty-a0-gf-a0-59.ucode /lib/firmware
```

4. Unload and reload the iwlwifi driver.

```
# modprobe -r iwlwifi && modprobe iwlwifi
```



To check to see both Ethernet and Wireless Networks, run the following command:

# ifconfig -a

- ➔ *enp11s0* indicates the ethernet device
- ➔ *wlp9s0* indicates the wireless network

```

root@lenovo-ThinkPad-P15-Gen-2i: /home/lenovo/Downloads
root@lenovo-ThinkPad-P15-Gen-2i:/home/lenovo/Downloads# ifconfig -a
enp11s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.219 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 2600:1700:720:e490::46 prefixlen 128 scopeid 0x0<global>
    inet6 2600:1700:720:e490:b115:21:b2ac:f7fe prefixlen 64 scopeid 0x0<global>
    inet6 2600:1700:720:e490:cbbc:4fdc:94da:d257 prefixlen 64 scopeid 0x0<global>
    inet6 fe80::efe1:e3b:d7c5:e0bf prefixlen 64 scopeid 0x20<link>
    ether 90:2e:16:18:af:22 txqueuelen 1000 (Ethernet)
    RX packets 26655 bytes 2929779 (2.9 MB)
    RX errors 0 dropped 5957 overruns 0 frame 0
    TX packets 3518 bytes 334868 (334.8 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device memory 0x9e400000-9e4fffff

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 860 bytes 81951 (81.9 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 860 bytes 81951 (81.9 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlp9s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.80 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 2600:1700:720:e490:bde4:2d11:2044:61cc prefixlen 64 scopeid 0x0<global>
    inet6 2600:1700:720:e490::43 prefixlen 128 scopeid 0x0<global>
    inet6 fe80::c2d0:f364:c17f:39d prefixlen 64 scopeid 0x20<link>
    inet6 2600:1700:720:e490:bf09:d33f:a304:34ce prefixlen 64 scopeid 0x0<global>
    ether 04:56:e5:db:4d:72 txqueuelen 1000 (Ethernet)
    RX packets 21197 bytes 2987489 (2.9 MB)
    RX errors 0 dropped 5649 overruns 0 frame 0
    TX packets 1591 bytes 174165 (174.1 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@lenovo-ThinkPad-P15-Gen-2i:/home/lenovo/Downloads#

```

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## Section 5 – Installing the Nvidia Graphics Driver

In order to get optimal performance out of the Nvidia GPU, it's a good idea to ensure the latest Nvidia graphics driver is installed. Follow these steps below to install an Nvidia Graphics driver on the system.

1. Blacklist the Linux Nouveau driver, by adding '*blacklist nouveau*' to the end of the following `/etc/modprobe.d/blacklist.conf` file.

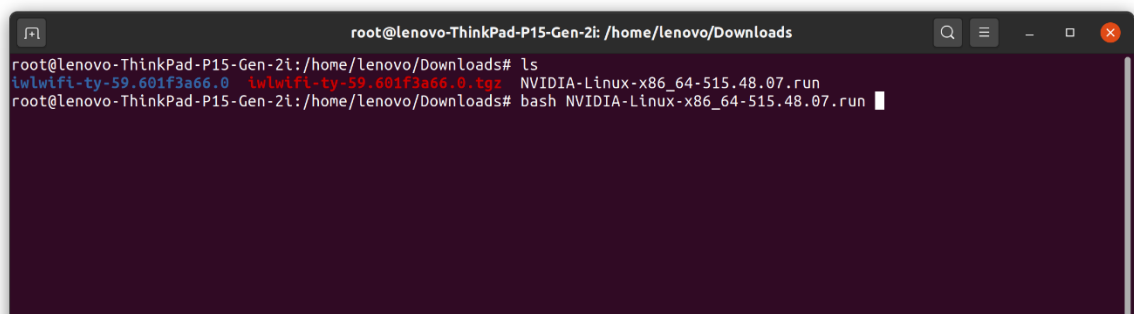
```
# nano /etc/modprobe.d/blacklist.conf
```

➔ Add '*blacklist nouveau*' to the end of this file.

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

2. Download the latest Nvidia driver from Nvidia's website for the graphics device used in the system.
3. Install the Nvidia driver downloaded by running the following command:

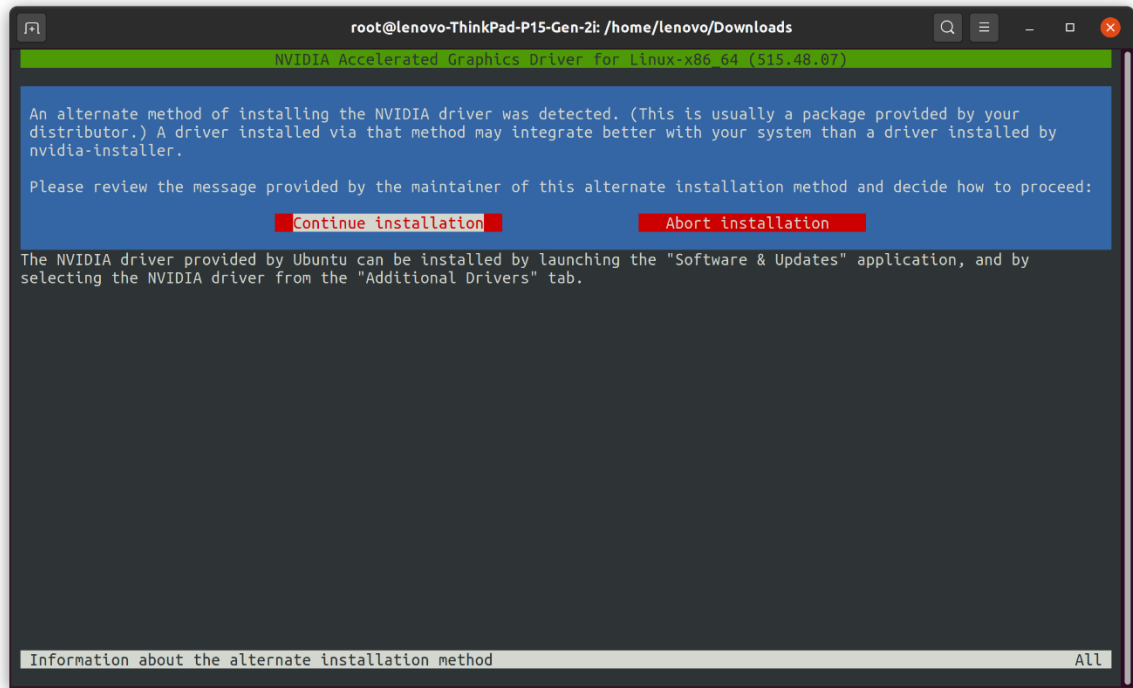
```
# bash NVIDIA*
```



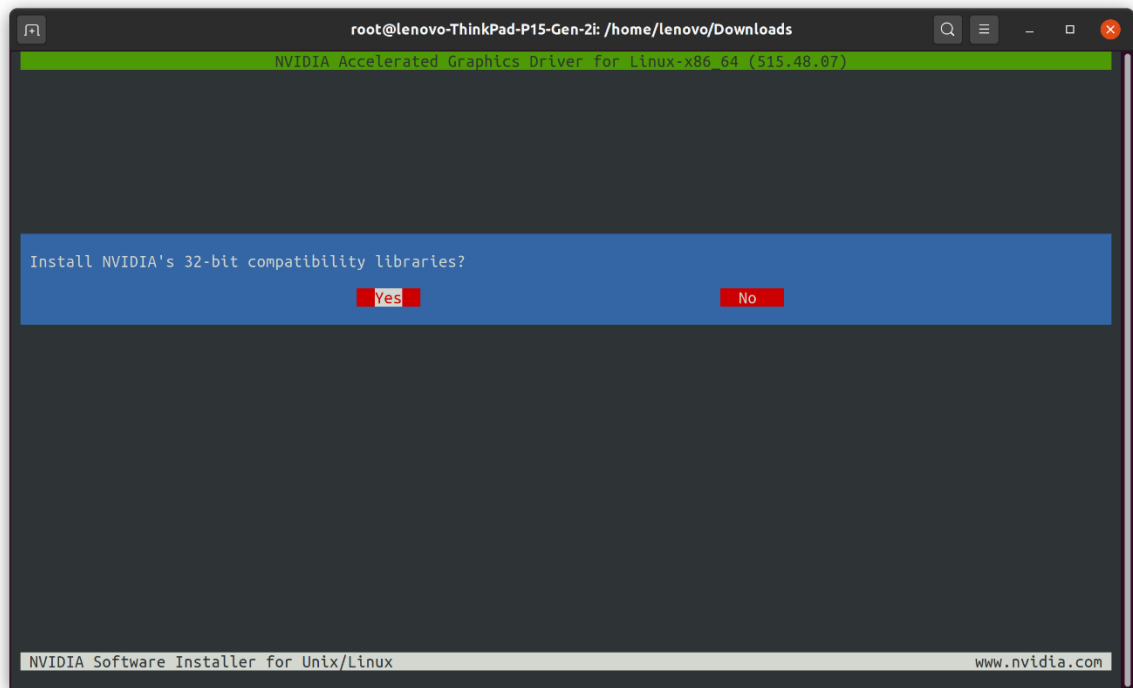
```
root@lenovo-ThinkPad-P15-Gen-2i: /home/lenovo/Downloads  
root@lenovo-ThinkPad-P15-Gen-2i:/home/lenovo/Downloads# ls  
iwlwifi-ty-59.601f3a66.0  iwlwifi-ty-59.601f3a66.0.tgz  NVIDIA-Linux-x86_64-515.48.07.run  
root@lenovo-ThinkPad-P15-Gen-2i:/home/lenovo/Downloads# bash NVIDIA-Linux-x86_64-515.48.07.run
```

4. Follow the onscreen driver installation prompts to completion.

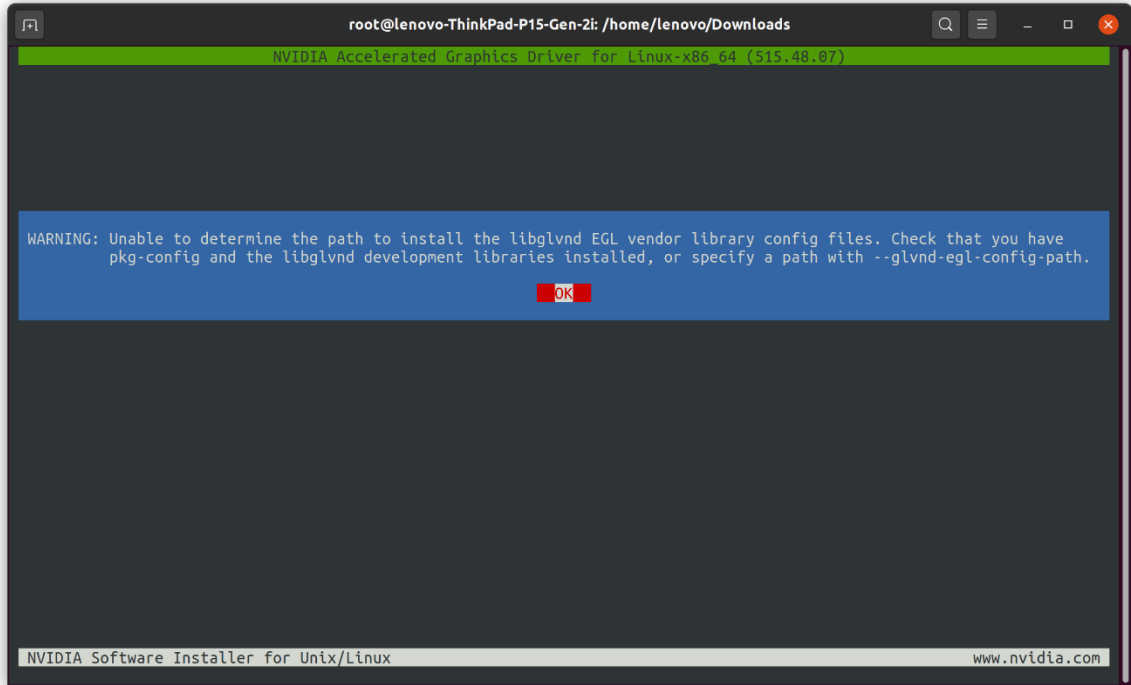
→ Select 'Continue Installation'.



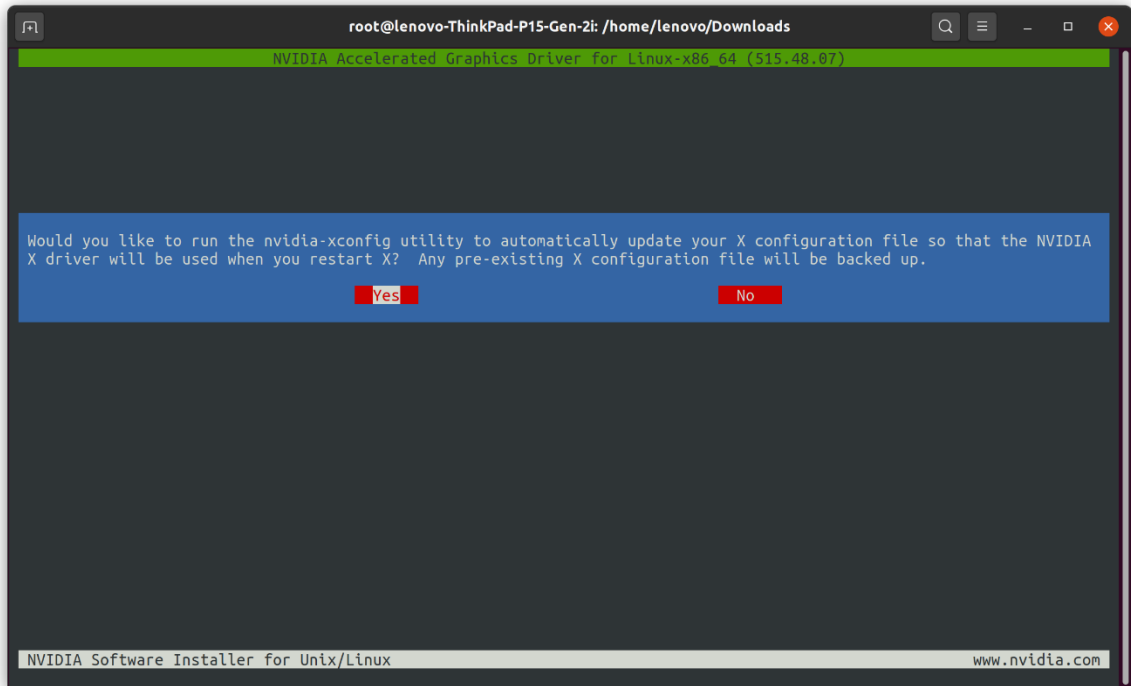
→ Select 'Yes' to install 32-bit compatibility libraries.



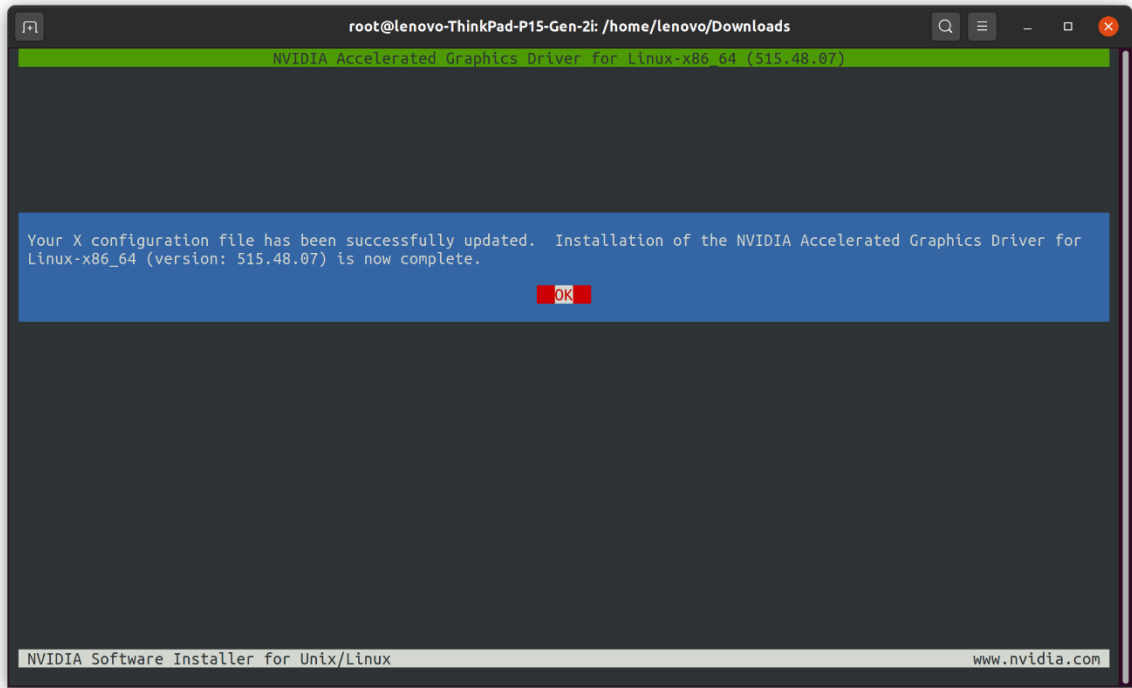
→ Select 'OK' at the 'WARNING' prompt.



→ Select 'Yes' to update the x-configuration file.

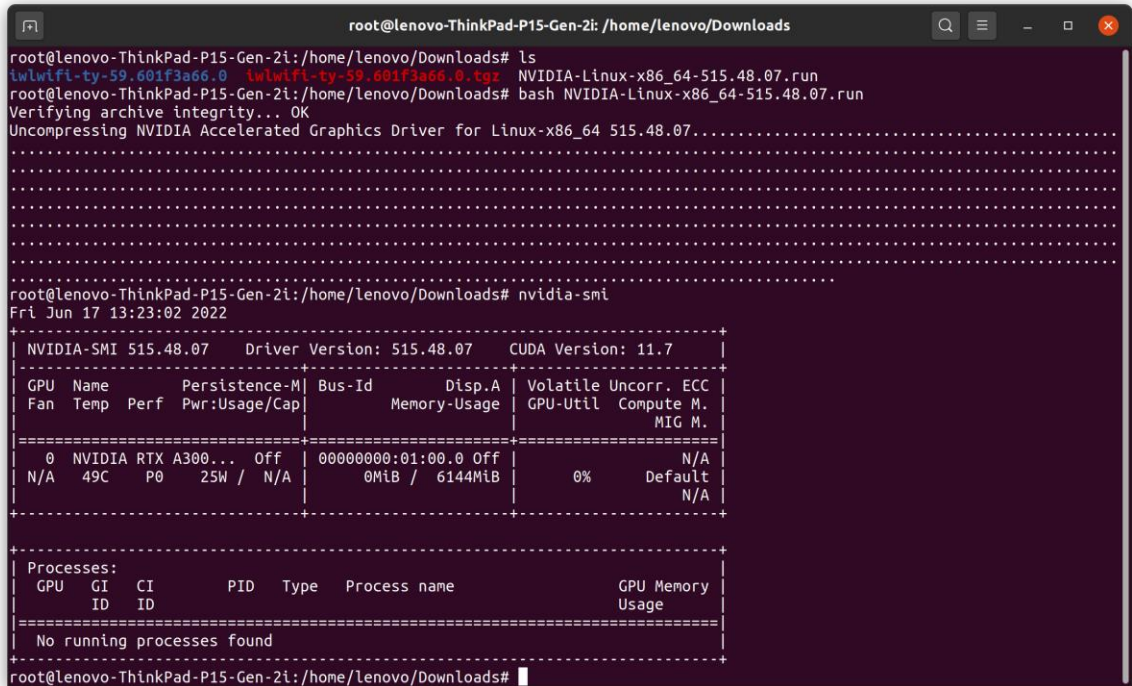


- Select 'OK' indicating that the x-configuration file was successfully updated and that the driver was successfully installed.



5. Check to see if the driver installed and loaded properly.

# nvidia-smi



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# Revision History

Version	Date	Author	Changes/Updates
1.0	6/17/2022	Jason Moebis	Initial release.