

# Debian GNU/Linux Setup Guide

For ThinkPad P1 Gen 2

*\*\*\* Official support of Debian 10.0 and later.*



**debian**

## Section 1 – BIOS Setup and Pre-Installation Steps

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 ‘Restart’ menu tab and set “OS Optimized Defaults” to “Disabled”.



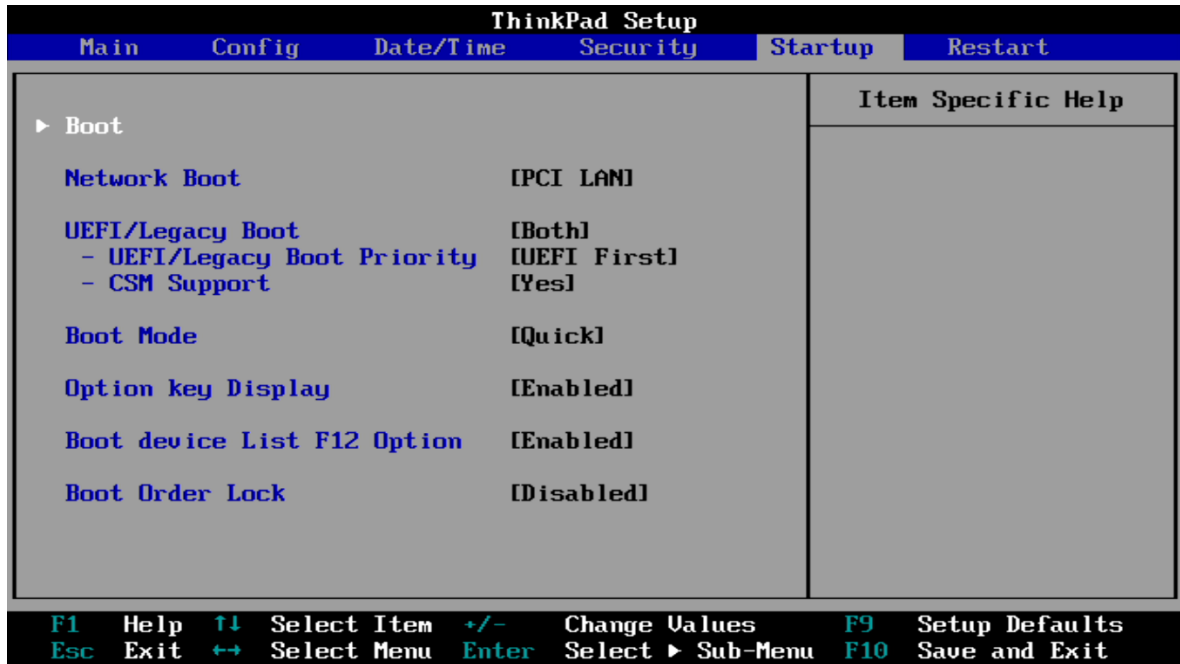
- Switching the “OS Optimized Defaults” settings may give a warning message. Select “Yes” to continue to disable OS Optimized Defaults.

ThinkPad Setup			
Main	Config	Date/Time	Security
Exit Saving Changes Exit Discarding Changes		Item Specific Help	
<b>Attention!</b>			
If OS Optimized Defaults is changed to Disabled, the default value of some security settings including Secure Boot, Secure RollBack Prevention and Virtualization features are disabled. Do you really want to continue? Select Yes to continue to disable the OS Optimized Defaults. Select No to discontinue the operation.			
[Yes]		[No]	
		Boot, Secure RollBack Prevention, and Virtualization features.	
F1	Help	↑↓	Select Item
Esc	Exit	↔	Select Menu
+/-	Change Values		
Enter	Select	▶	Sub-Menu
F9	Setup Defaults		
F10	Save and Exit		

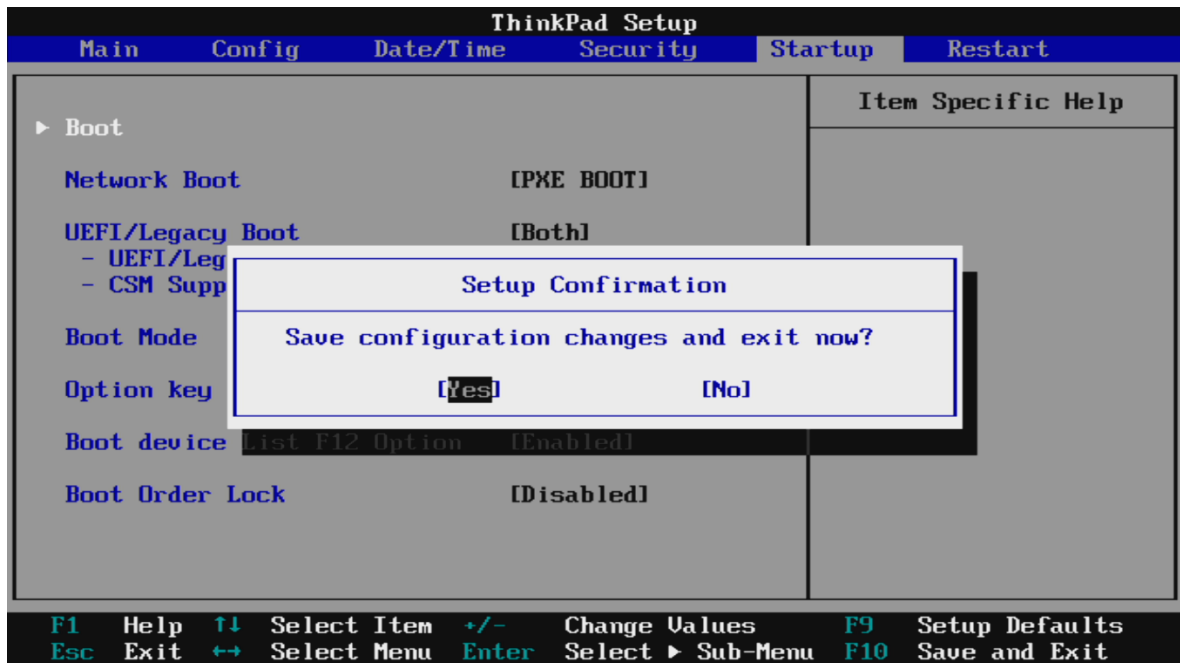
- Tab over to the “Startup” menu tab.

ThinkPad Setup			
Main	Config	Date/Time	Startup
▶ Boot		Item Specific Help	
Network Boot		[PXE BOOT]	
UEFI/Legacy Boot - CSM Support		[UEFI Only] [No] * Unselectable for Secure Boot	
Boot Mode		[Quick]	
Option key Display		[Enabled]	
Boot device List F12 Option		[Enabled]	
Boot Order Lock		[Disabled]	
F1	Help	↑↓	Select Item
Esc	Exit	↔	Select Menu
+/-	Change Values		
Enter	Select	▶	Sub-Menu
F9	Setup Defaults		
F10	Save and Exit		

- Pressing F9 function key will allow Legacy and UEFI bootable devices by setting “UEFI/Legacy Boot” to “Both”; otherwise, it will be an unchangeable setting to “UEFI only”.



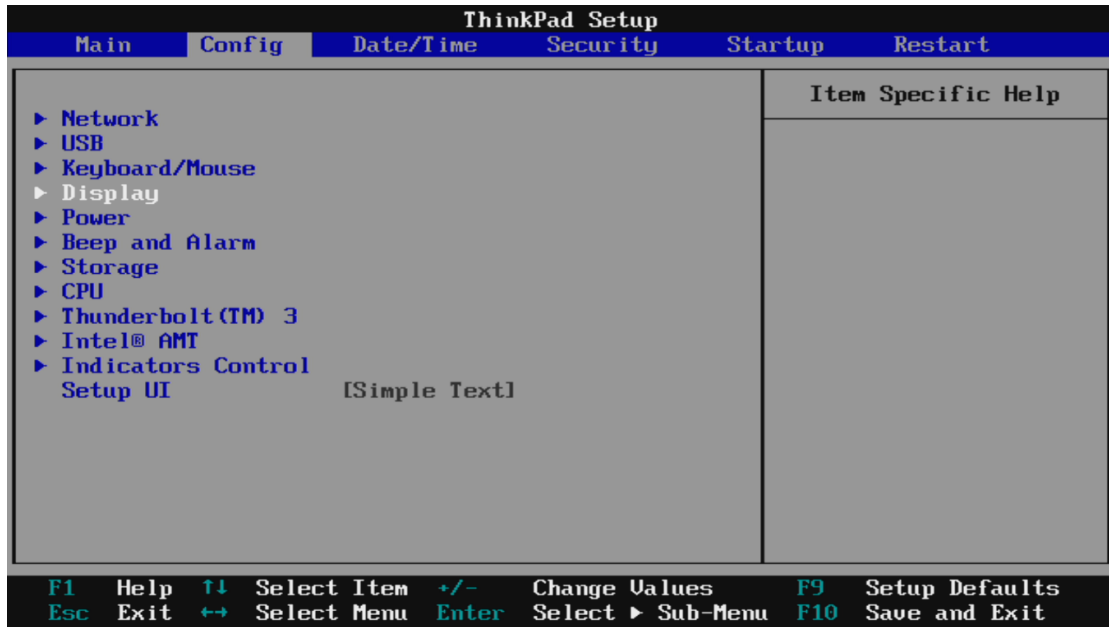
- Press function F10 key to save and exit BIOS setup.



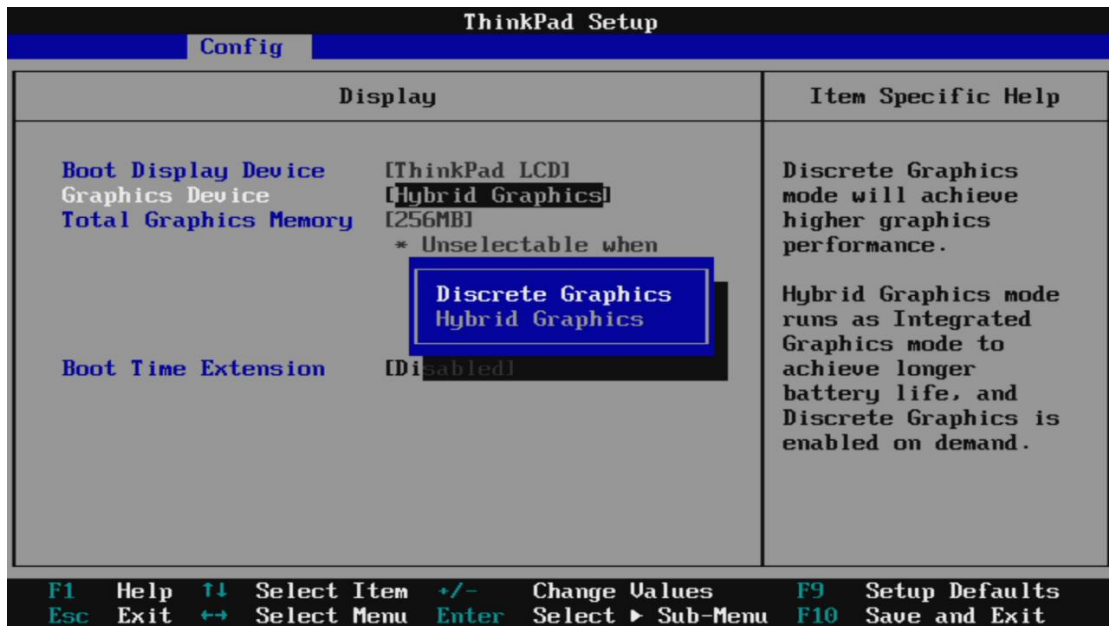
## Section 2 – Discrete vs Hybrid Graphics

The Thinkpad P1 Gen 2 offers both Nvidia and Intel graphics. To run exclusively Nvidia graphics, use the discrete graphics mode highlighted below. **Note:** Before attempting to install Debian 10, the P1 Gen 2 must be set to Hybrid Mode until the Nvidia graphics driver can be installed.

- Boot into BIOS, tab over to the “Config” menu option, and select the “Display” option.



- By default, the “Graphics Device” will likely be set to “Hybrid Graphics”. To run exclusively Nvidia graphics, set the “Graphics Device” to “Discrete Graphics”.



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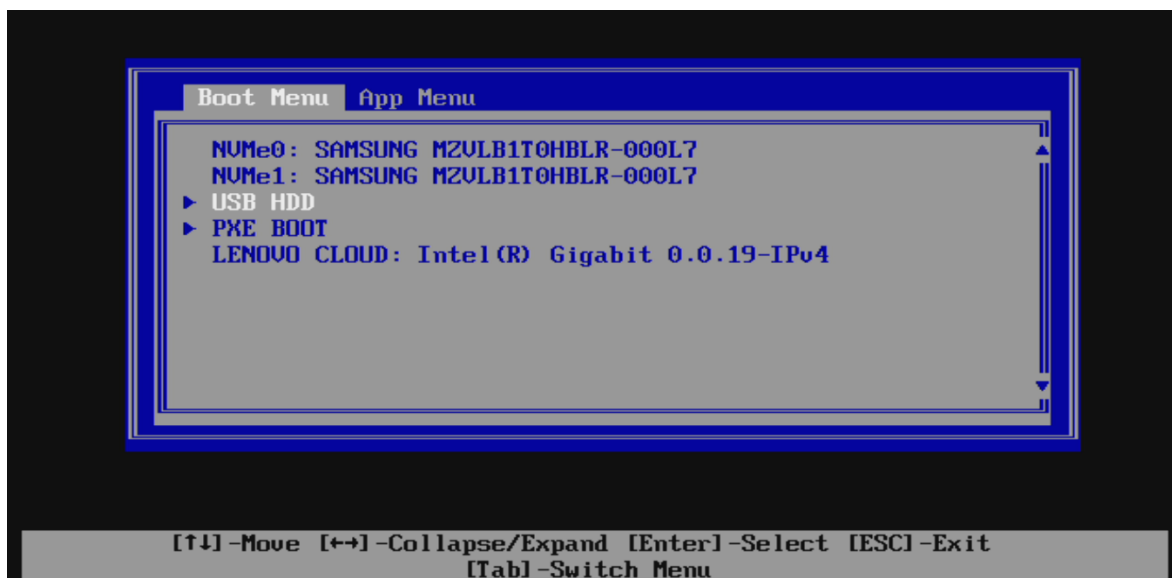
## Section 3 – Installing Debian 10.x

Please refer to the following instructions and screenshots on how to install Debian 10 on the Lenovo Thinkpad P1 Gen 2.

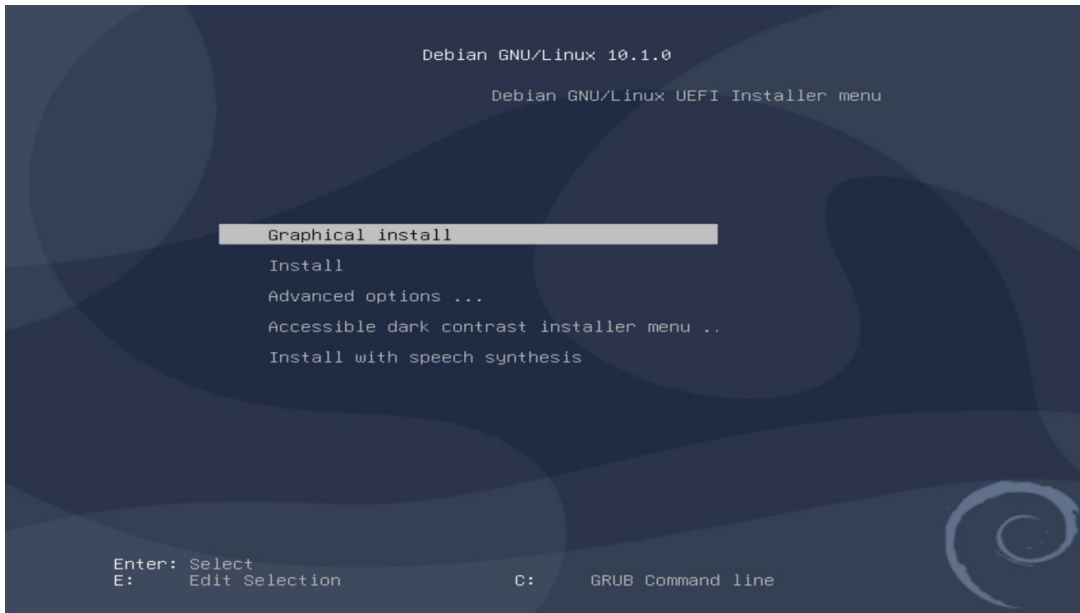
- Insert the Debian 10 installation media (either through USB or CD/DVD).
- Power on the system and press the F12 function key whenever the following Lenovo splash screen appears.



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



- Select “Graphical install” from the Debian boot menu to begin setup.



- The Touchpad may not be usable until the setup is complete, and the system boots up. In this case the TrackPoint must be used during setup.

- Select the appropriate language and “Continue”.



- Continue to personalize options.



### Select your location


The selected location will be used to set your time zone and also for example to help select the system locale. Normally this should be the country where you live.

This is a shortlist of locations based on the language you selected. Choose "other" if your location is not listed.

*Country, territory or area:*

- Ireland
- Israel
- New Zealand
- Nigeria
- Philippines
- Seychelles
- Singapore
- South Africa
- United Kingdom
- United States**
- Zambia
- Zimbabwe
- other

**Screenshot** Go Back Continue



### Configure the keyboard

*Keymap to use:*

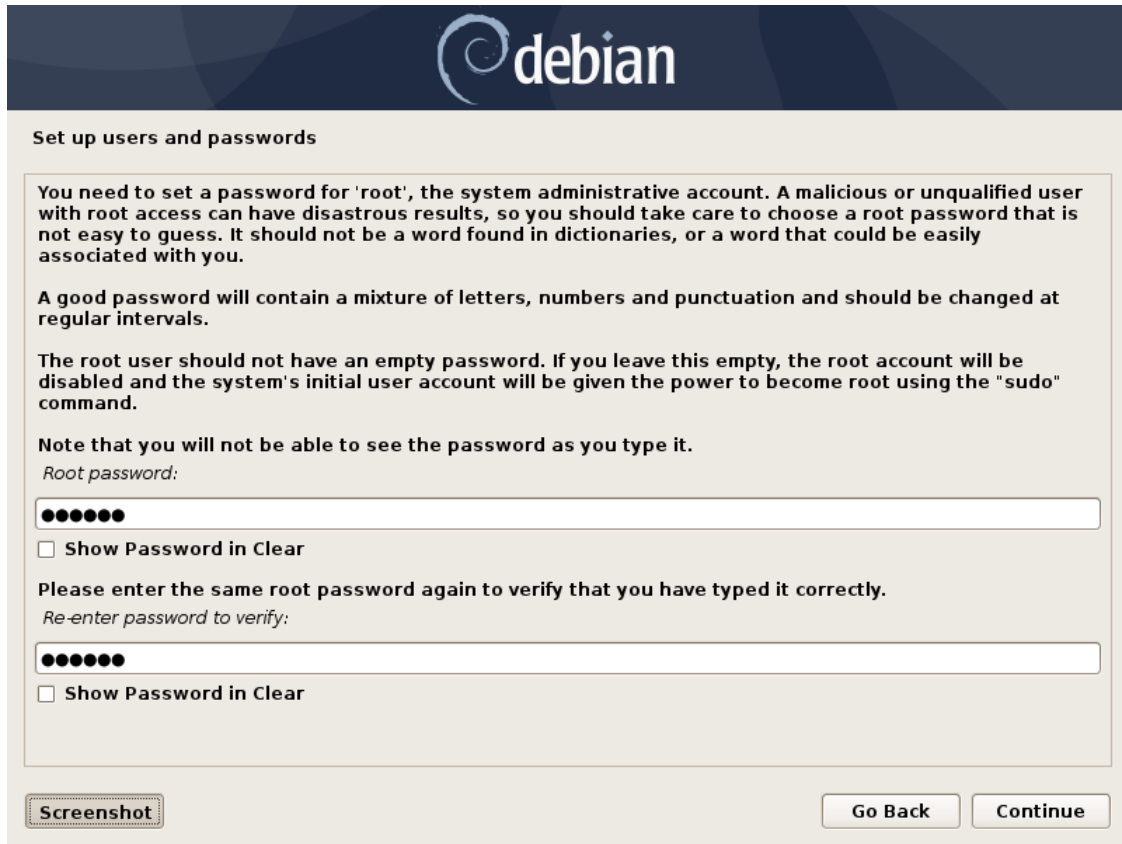
- American English**
- Albanian
- Arabic
- Asturian
- Bangladesh
- Belarusian
- Bengali
- Belgian
- Bosnian
- Brazilian
- British English
- Bulgarian (BDS layout)
- Bulgarian (phonetic layout)
- Burmese
- Canadian French
- Canadian Multilingual
- Catalan

**Screenshot** Go Back Continue





- Set the desired root password



The screenshot shows the 'Set up users and passwords' screen in the Debian installer. At the top is the Debian logo. Below it, the title 'Set up users and passwords' is displayed. The main content area contains several paragraphs of instructions: 'You need to set a password for 'root', the system administrative account. A malicious or unqualified user with root access can have disastrous results, so you should take care to choose a root password that is not easy to guess. It should not be a word found in dictionaries, or a word that could be easily associated with you.' 'A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.' 'The root user should not have an empty password. If you leave this empty, the root account will be disabled and the system's initial user account will be given the power to become root using the "sudo" command.' 'Note that you will not be able to see the password as you type it.' Below this, there are two password input fields. The first is labeled 'Root password:' and contains six black dots. Below it is a checkbox labeled 'Show Password in Clear'. The second field is labeled 'Re-enter password to verify:' and also contains six black dots, with a 'Show Password in Clear' checkbox below it. At the bottom left is a 'Screenshot' button, and at the bottom right are 'Go Back' and 'Continue' buttons.

- Set the desired user name.



The screenshot shows the 'Set up users and passwords' screen in the Debian installer, continuing from the previous step. It features the Debian logo at the top. The title 'Set up users and passwords' is present. The main content area contains instructions: 'A user account will be created for you to use instead of the root account for non-administrative activities.' 'Please enter the real name of this user. This information will be used for instance as default origin for emails sent by this user as well as any program which displays or uses the user's real name. Your full name is a reasonable choice.' Below this, there is a text input field labeled 'Full name for the new user:' which is currently empty. At the bottom left is a 'Screenshot' button, and at the bottom right are 'Go Back' and 'Continue' buttons.

- Set the password for the user.



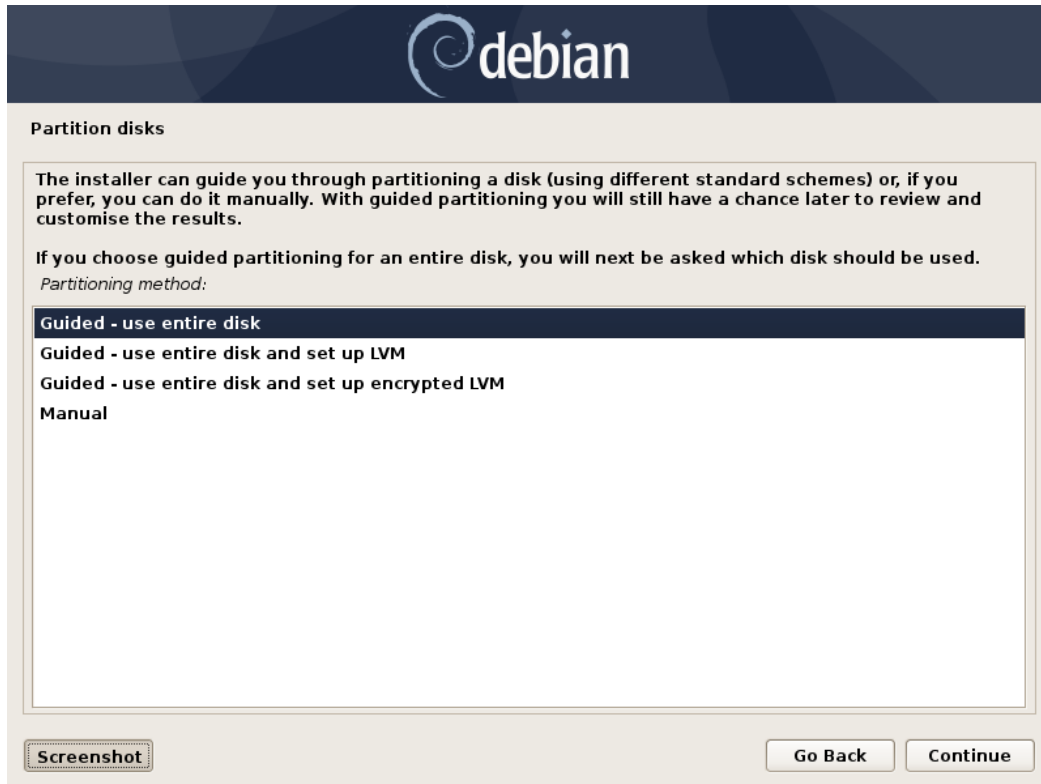
The screenshot shows the 'Set up users and passwords' screen in the Debian installer. At the top is the Debian logo. Below it, the title 'Set up users and passwords' is displayed. A message states: 'A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.' Below this, it says 'Choose a password for the new user:' followed by a password input field containing seven dots. A checkbox labeled 'Show Password in Clear' is present. The next message says: 'Please enter the same user password again to verify you have typed it correctly.' Below this, it says 'Re-enter password to verify:' followed by another password input field with seven dots and a 'Show Password in Clear' checkbox. At the bottom left is a 'Screenshot' button, and at the bottom right are 'Go Back' and 'Continue' buttons.

- Select "No" when asked to force UEFI Installation.

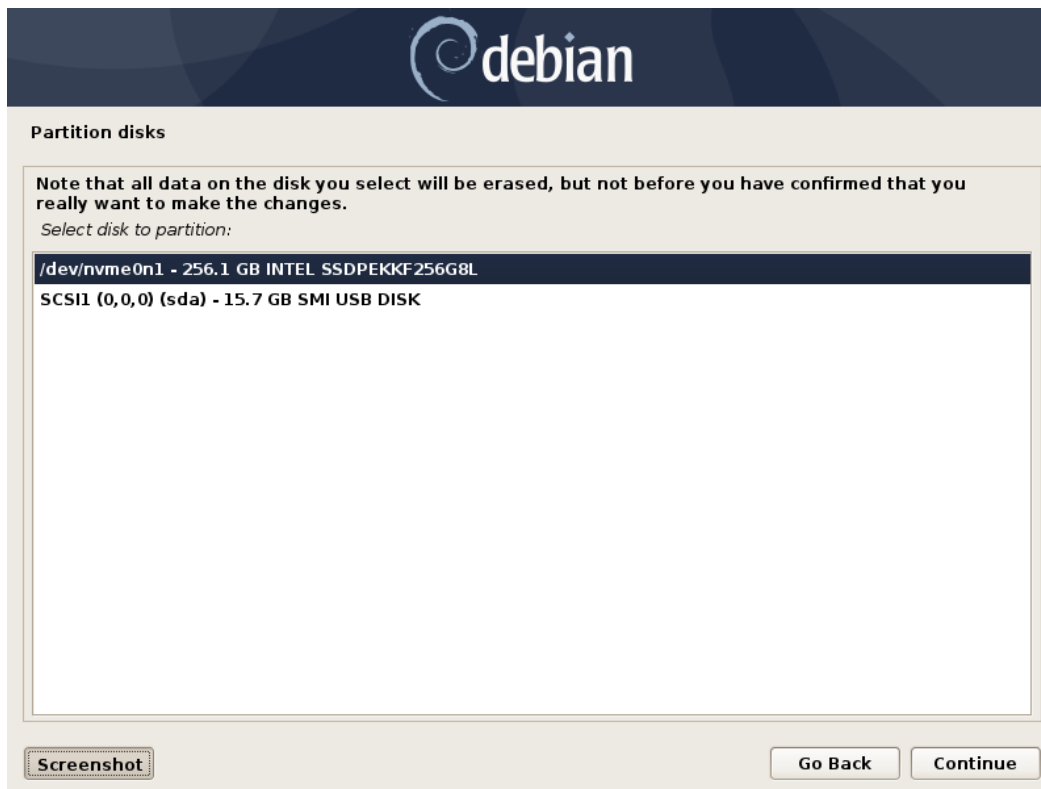


The screenshot shows the 'Partition disks' screen in the Debian installer. At the top is the Debian logo. Below it, the title 'Partition disks' is displayed. A message states: 'This machine's firmware has started the installer in UEFI mode but it looks like there may be existing operating systems already installed using "BIOS compatibility mode". If you continue to install Debian in UEFI mode, it might be difficult to reboot the machine into any BIOS-mode operating systems later.' Below this, it says: 'If you wish to install in UEFI mode and don't care about keeping the ability to boot one of the existing systems, you have the option to force that here. If you wish to keep the option to boot an existing operating system, you should choose NOT to force UEFI installation here.' Below this, it says 'Force UEFI installation?' followed by two radio button options: 'No' (which is selected) and 'Yes'. At the bottom left is a 'Screenshot' button, and at the bottom right are 'Go Back' and 'Continue' buttons.

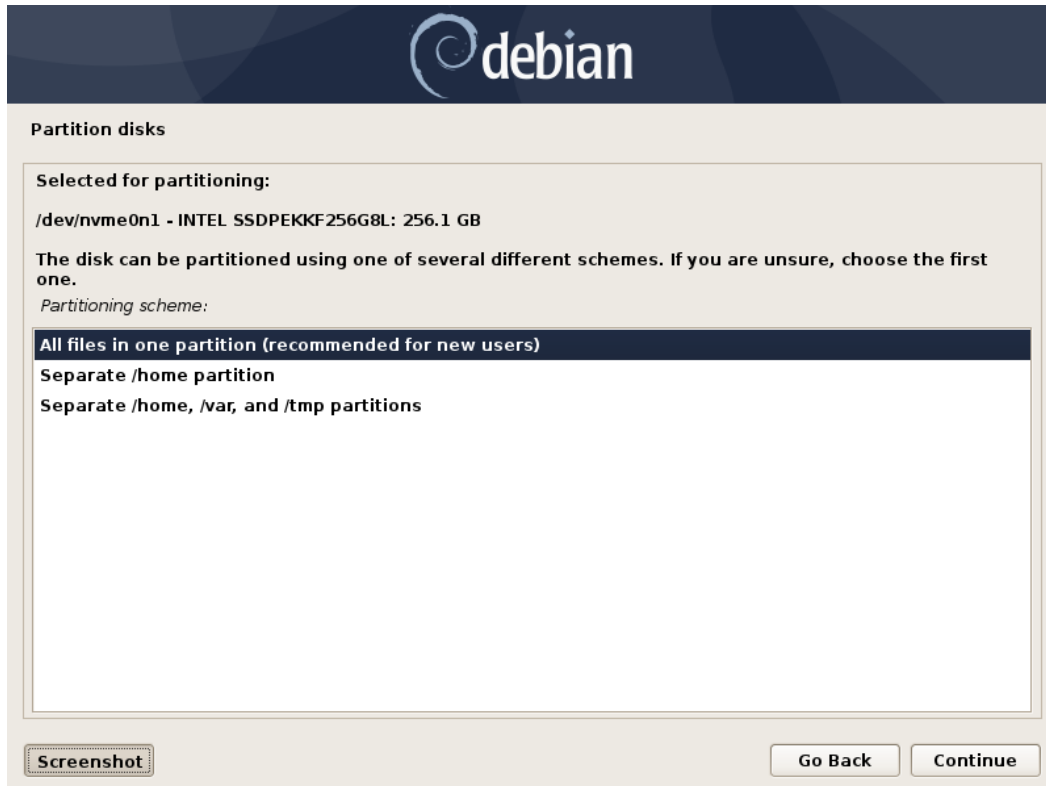
- Choose “Guided – use entire disk” partitioning method.



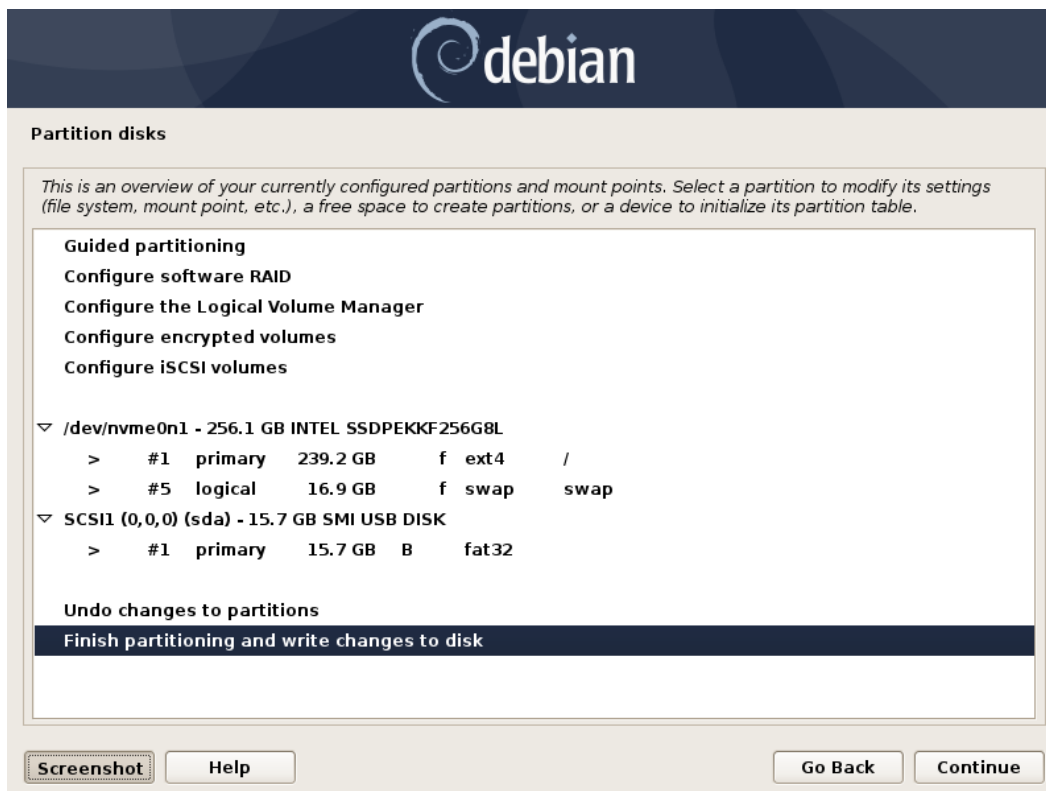
- Select the storage device on which to install the operating system.



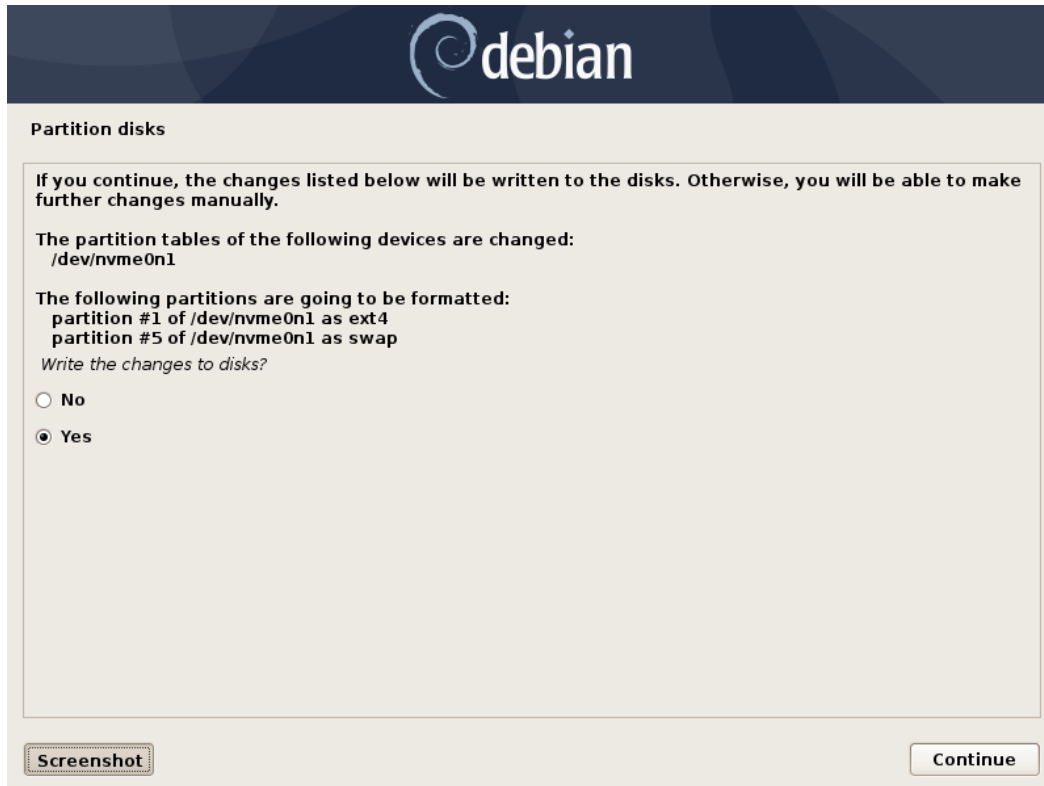
- Chose “All files in one partition...” as the partitioning scheme.



- Choose to “Finish partitioning and write changes to disk”



- Next select “Yes” to write the changes to the disk.



- Choose “No” when asked to use a network mirror.



- Choose desired software to install.



- Choose the desired default display manager.



- Select “Yes” to install the GRUB boot loader to the master boot record.



- Select the boot disk for boot loader installation.



## Section 4 – Wireless Network Driver

The wireless network driver is not native to the Debian 10 kernel, so users will not be able to connect to wireless networks by default. The following methods can be used to enable the wireless network on a ThinkPad P1 Gen 2.

**Option 1:** Update the *iw/wifi* module:

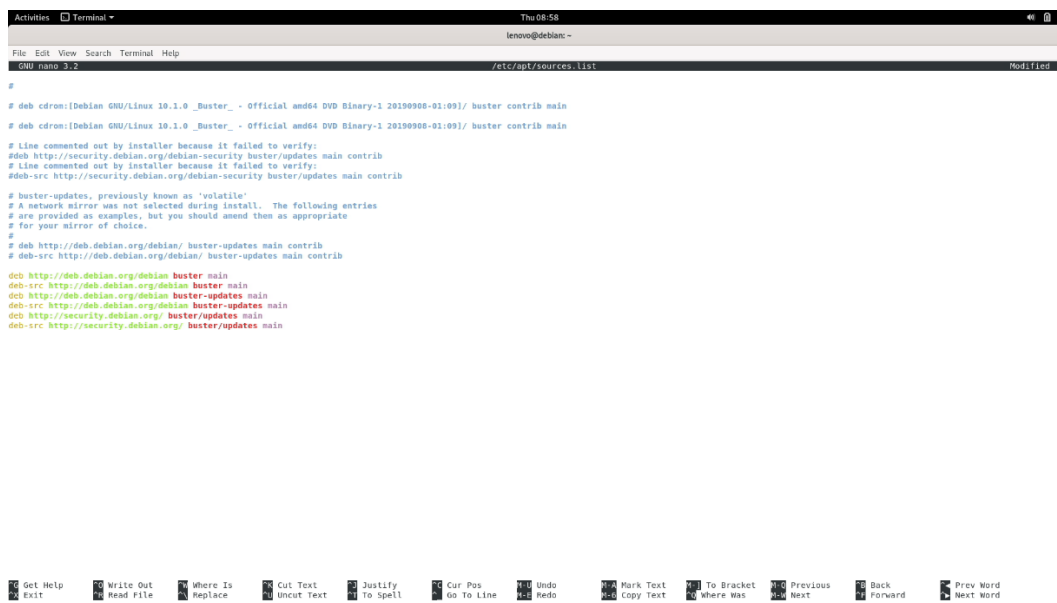
**Step 1:** Make sure you are connected to a network via a wired LAN connection

**Step 2:** Update the sources as follows:

# su -

# nano /etc/apt/sources.list

- Comment out the “deb cdrom:...” source
- ```
deb http://deb.debian.org/debian buster main
deb-src http://deb.debian.org/debian buster main
deb http://deb.debian.org/debian buster-updates main
deb-src http://deb.debian.org/debian buster-updates main
deb http://security.debian.org/ buster/updates main
deb-src http://security.debian.org/ buster/updates main
```



```

#
# deb cdrom:[Debian GNU/Linux 10.1.0 _Buster_ - Official amd64 DVD Binary-1 20190906-01:09]/ buster contrib main
# deb cdrom:[Debian GNU/Linux 10.1.0 _Buster_ - Official amd64 DVD Binary-1 20190906-01:09]/ buster contrib main
# Line commented out by installer because it failed to verify:
# deb http://security.debian.org/debian-security buster/updates main contrib
# Line commented out by installer because it failed to verify:
# deb-src http://security.debian.org/debian-security buster/updates main contrib
# buster-updates, previously known as 'volatile'
# A network mirror was not selected during install. The following entries
# are provided as examples, but you should amend them as appropriate
# for your mirror of choice.
#
# deb http://deb.debian.org/debian/ buster-updates main contrib
# deb-src http://deb.debian.org/debian/ buster-updates main contrib
deb http://deb.debian.org/debian buster main
deb-src http://deb.debian.org/debian buster main
deb http://deb.debian.org/debian buster-updates main
deb-src http://deb.debian.org/debian buster-updates main
deb http://security.debian.org/ buster/updates main
deb-src http://security.debian.org/ buster/updates main

```



**Step 3:** Update the sources.list file

```
# apt-get update
```

**Step 4:** Install the development tools package

```
# apt install git build-essential
```

**Step 5:** Install linux kernel headers package

```
# apt install linux-headers-$(uname -r)
```

**Step 6:** Install the *iwlwifi* package.

```
# git clone https://git.kernel.org/pub/scm/linux/kernel/git/iwlwifi/backport-iwlwifi.git
# cd backport-iwlwifi/
# make defconfig-iwlwifi-public
# sed -i 's/CPTCFG_IWLMMV_VENDOR_CMDS=y/# CPTCFG_IWLMMV_VENDOR_CMDS is not set/' .config
# make -j4
# make install
```

**Step 7:** Install the Intel Wireless Driver

```
# wget https://wireless.wiki.kernel.org/\_media/en/users/drivers/iwlwifi/iwlwifi-cc-46.3cfab8da.0.tgz
# tar xzf iwlwifi*
# cd iwlwifi*/
# cp iwlwifi*/lib/firmware/
# cp LICENSE*/lib/firmware/
# modprobe iwlwifi
# reboot now
```

- When the system boots back up the wireless network should be enabled.

**Option 2:** Update the Linux kernel to 5.0:

```
# apt install linux-oem-osp1 linux-firmware
```

## Section 5 – Installing the Nvidia Graphics Driver

In order to get optimal performance out of the Nvidia GPU, it's a good idea to install the Nvidia graphics driver.

To install the latest Nvidia graphics driver, follow the steps below:

**Step 1:** Download the latest Nvidia graphics driver for the appropriate Nvidia GPU from <https://www.nvidia.com/Download/Find.aspx?lang=en-us>.

**Step 2:** Open a terminal window and blacklist the nouveau driver.

```
# su -
```

```
# bash -c "echo blacklist nouveau > /etc/modprobe.d/blacklist-nvidia-nouveau.conf"
```

```
# bash -c "echo options nouveau modeset=0 >> /etc/modprobe.d/blacklist-nvidia-nouveau.conf"
```



```

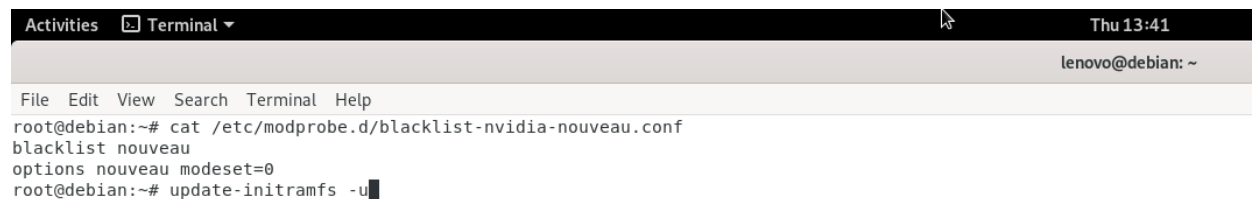
Activities Terminal Thu 13:08
lenovo@debian: ~
File Edit View Search Terminal Help
lenovo@debian:~$ su -
Password:
root@debian:~# bash -c "echo blacklist nouveau > /etc/modprobe.d/blacklist-nvidia-nouveau.conf"
root@debian:~# bash -c "echo options nouveau modeset=0 >> /etc/modprobe.d/blacklist-nvidia-nouveau.conf"

```

- Confirm the contents of the new modprobe config file with this command.

```
# cat /etc/modprobe.d/blacklist-nvidia-nouveau.conf
```

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



```

Activities Terminal Thu 13:41
lenovo@debian: ~
File Edit View Search Terminal Help
root@debian:~# cat /etc/modprobe.d/blacklist-nvidia-nouveau.conf
blacklist nouveau
options nouveau modeset=0
root@debian:~# update-initramfs -u

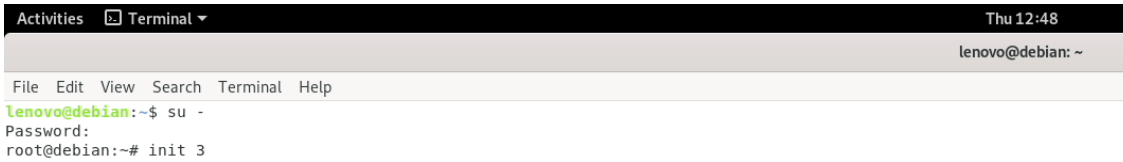
```

```
# reboot
```

**Step 3:** After rebooting the system, open a terminal window and stop x-windows as root.

```
# su -
```

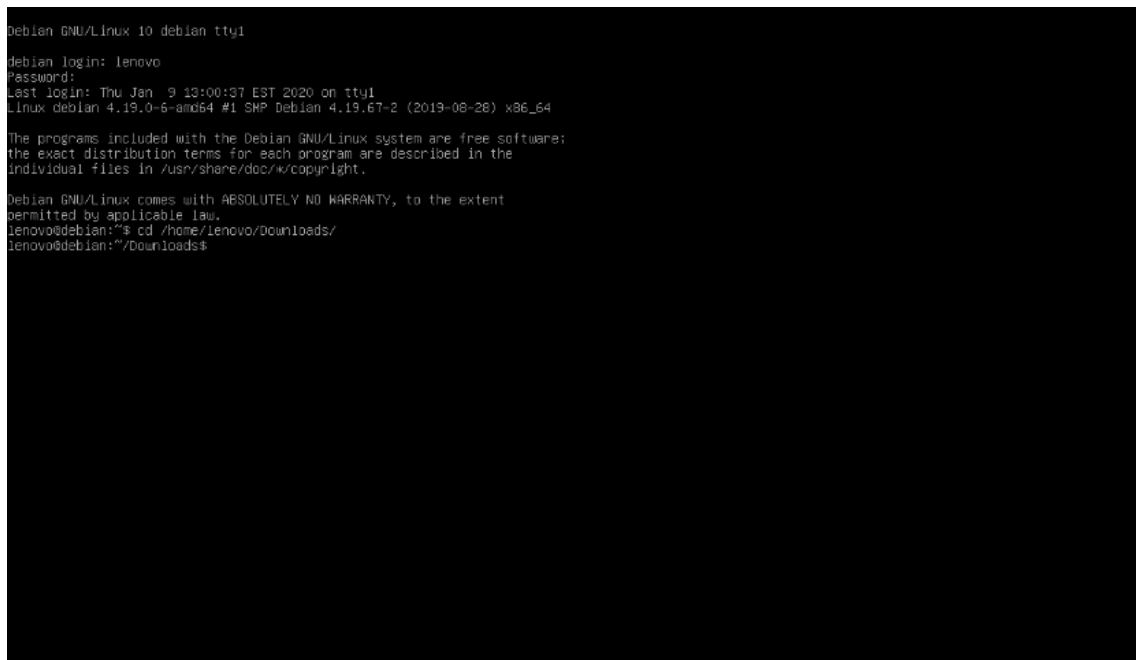
```
# init 3
```



```
Activities Terminal Thu 12:48
lenovo@debian: ~
File Edit View Search Terminal Help
lenovo@debian:~$ su -
Password:
root@debian:~# init 3
```

**Step 4:** Login and browse to the directory location to where the Nvidia driver installer is.

```
# cd /home/(username)/Downloads/
```



```
debian GNU/Linux 10 debian tty1
debian login: lenovo
Password:
Last login: Thu Jan  9 13:00:37 EST 2020 on tty1
Linux debian 4.19.0-6-amd64 #1 SMP Debian 4.19.67-2 (2019-08-28) x86_64

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

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
lenovo@debian:~$ cd /home/lenovo/Downloads/
lenovo@debian:~/Downloads$
```

**Step 5:** Make the Nvidia installer an executable then run it as root

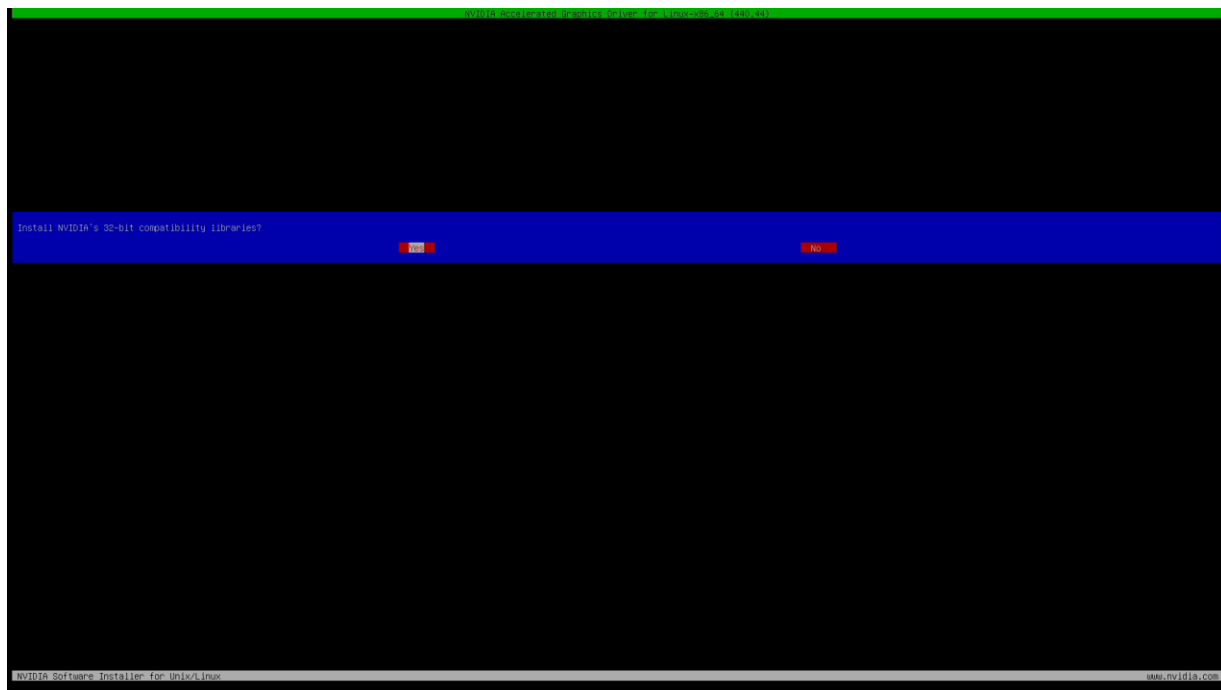
```
# chmod +x NVIDIA-Linux-x86-64-*
```

```
# su
```

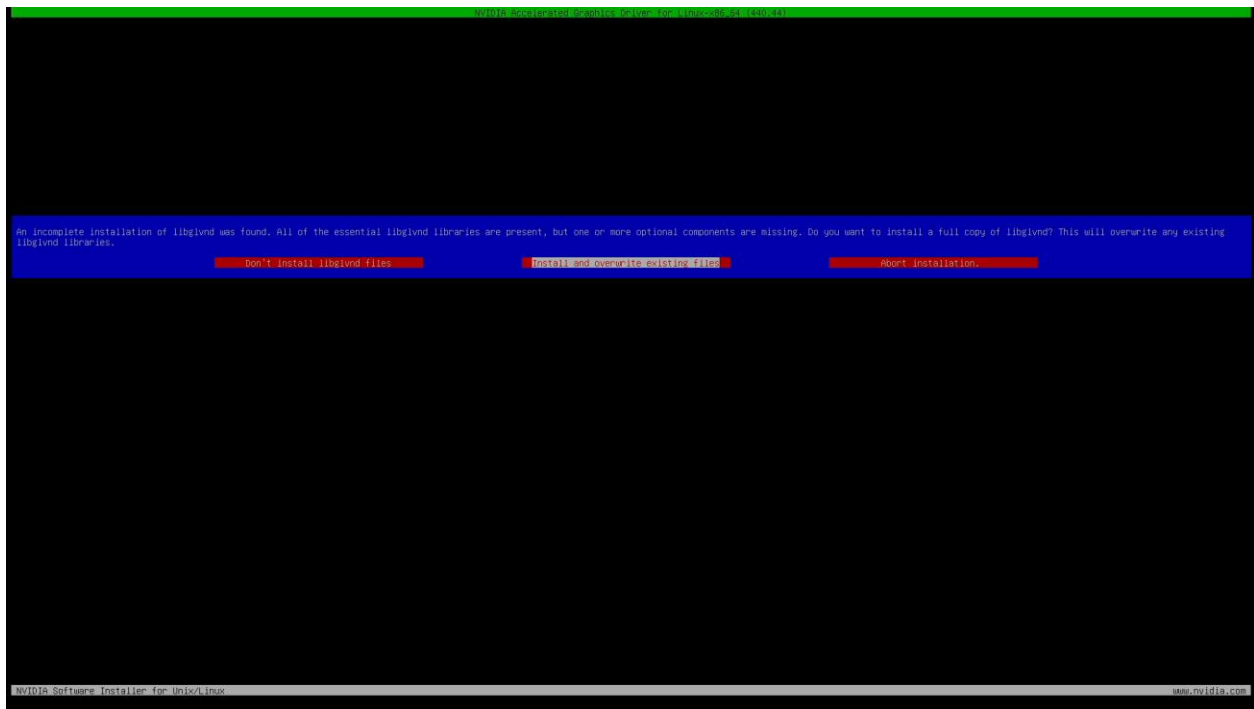
```
# ./NVIDIA-Linux-x86_64* --no-x-check
```

```
lenovo@debian:~/Downloads$ chmod +x NVIDIA-Linux-x86_64-440.44.run
lenovo@debian:~/Downloads$ su
Password:
root@debian:/home/lenovo/Downloads# ./NVIDIA-Linux-x86_64-440.44.run --no-x-check
```

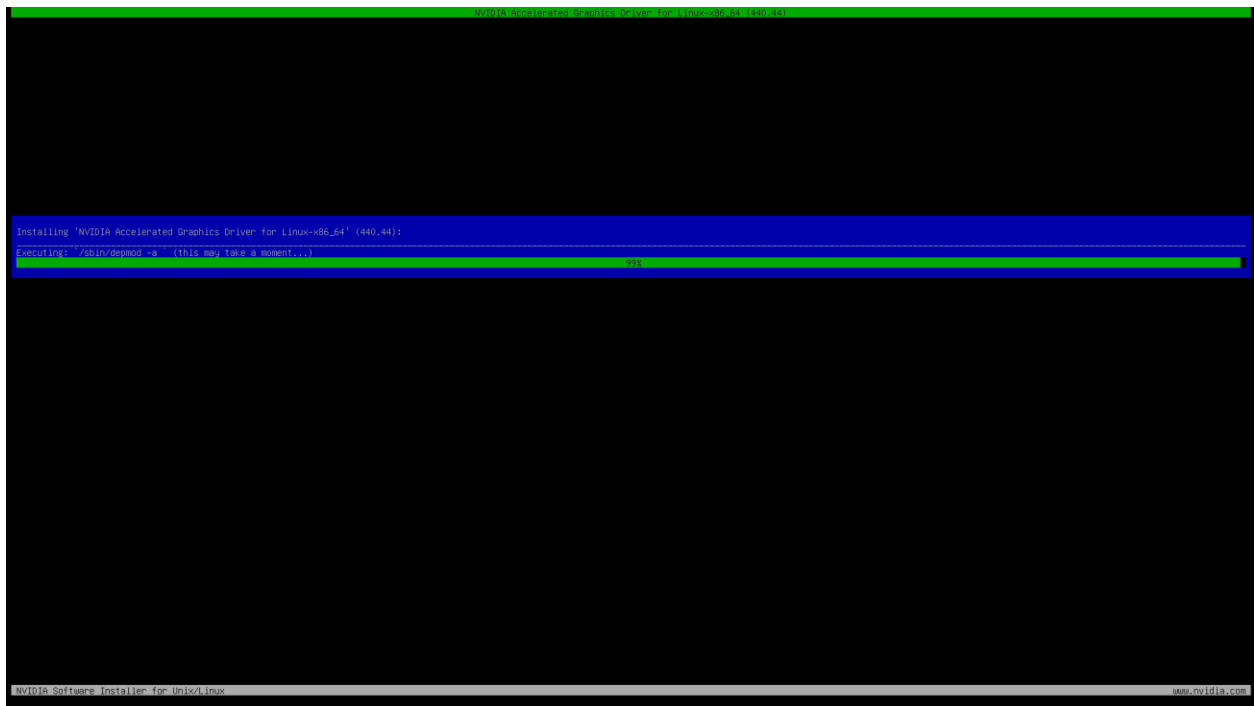
**Step 6:** Optional: Choose whether to install the 32-bit compatibility libraries.



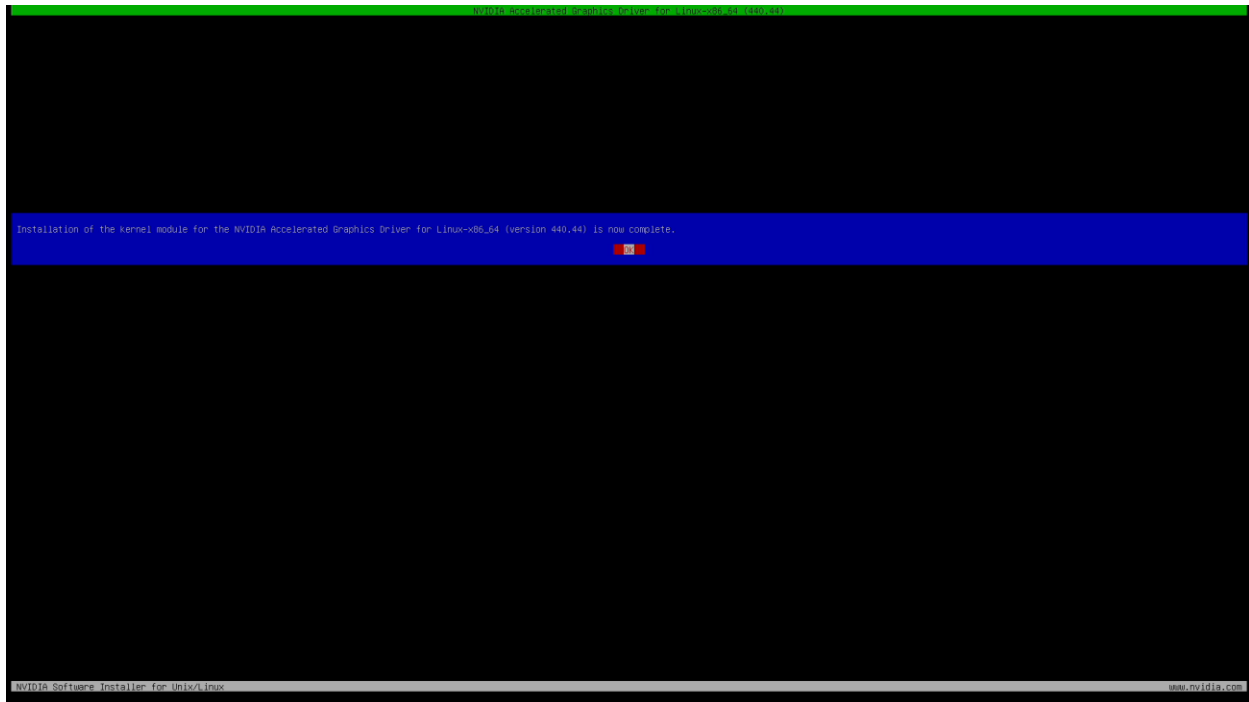
**Step 7:** Select to “Install and overwrite” libglvnd libraries.



**Step 8:** Nvidia driver installing progress bar may appear.

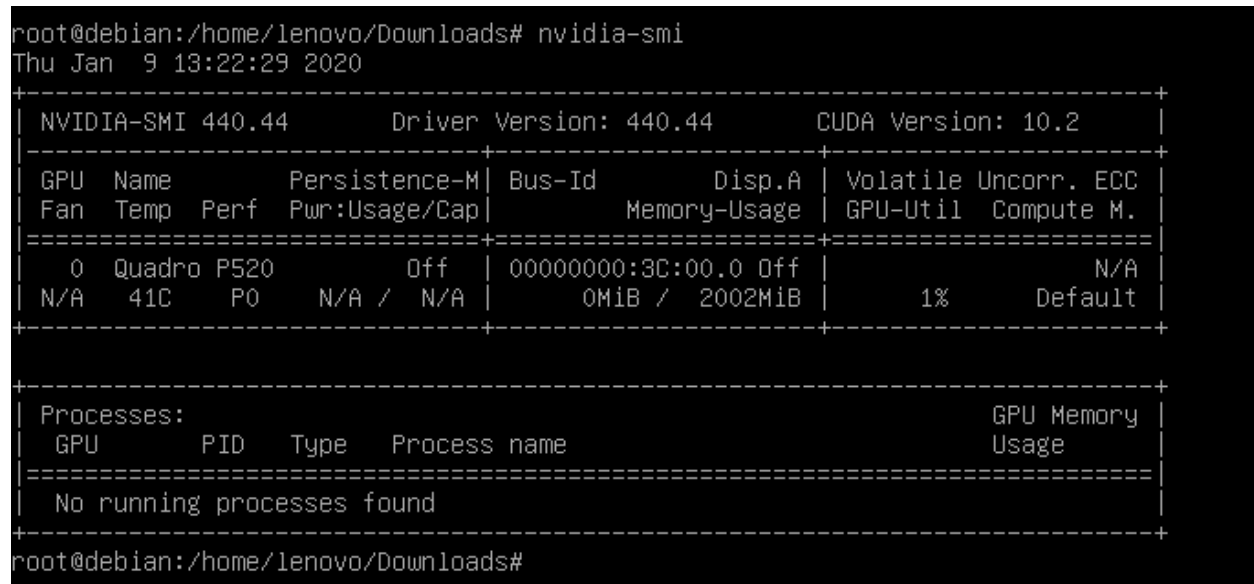


**Step 9:** The Nvidia driver should successfully be installed.



**Step 10:** Execute the following command to verify the Nvidia driver is loaded.

# nvidia-smi



**Step 12:** Reboot the system.

**Step 13:** During Reboot you may change the “Graphics Device” to “Discrete Graphics” to exclusively run Nvidia graphics (see Section 2 for more information).

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## Section 7 – Revision History

| Version | Date       | Author    | Changes/Updates        |
|---------|------------|-----------|------------------------|
| 1.0     | 01/24/2020 | Hady Asad | Initial launch release |