Debian GNU/Linux Setup Guide

For ThinkPad P53, P73

***Official support of Debian 10.0 and later.

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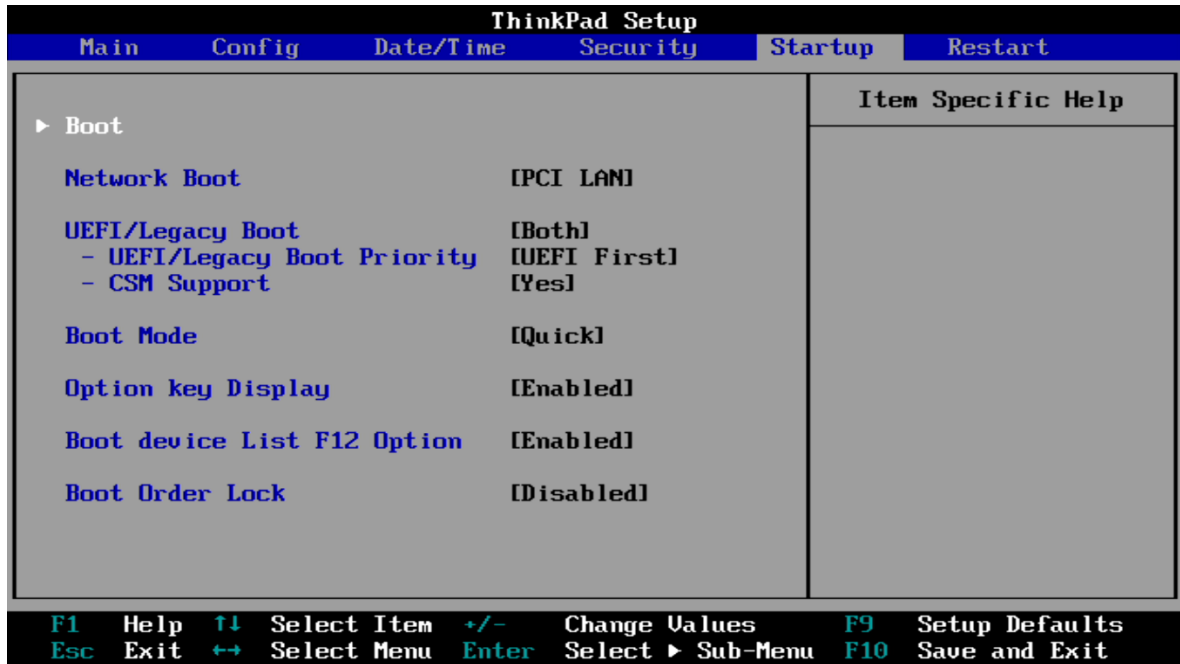
- Switching the "OS Optimized Defaults" settings may give a warning message. Select "Yes" to continue to disable OS Optimized Defaults.

```
                          ThinkPad Setup
     Main     Config    Date/Time    Security    Startup    Restart

                                              Item Specific Help
     Exit Saving Changes
     Exit Discarding Changes
 ┌──────────────────────────Attention!──────────────────────────┐
 │                                                               │
 │      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  +/-    Change Values    F9   Setup Defaults
     Esc  Exit  ↔   Select Menu  Enter  Select ▶ Sub-Menu  F10  Save and Exit
```

- Tab over to the "Startup" menu tab.

```
                          ThinkPad Setup
     Main     Config    Date/Time    Security    Startup    Restart

                                              Item Specific Help
  ▶ Boot

     Network Boot              [PXE BOOT]

     UEFI/Legacy Boot          [UEFI Only]
      - CSM Support            [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  +/-    Change Values    F9   Setup Defaults
     Esc  Exit  ↔   Select Menu  Enter  Select ▶ Sub-Menu  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".
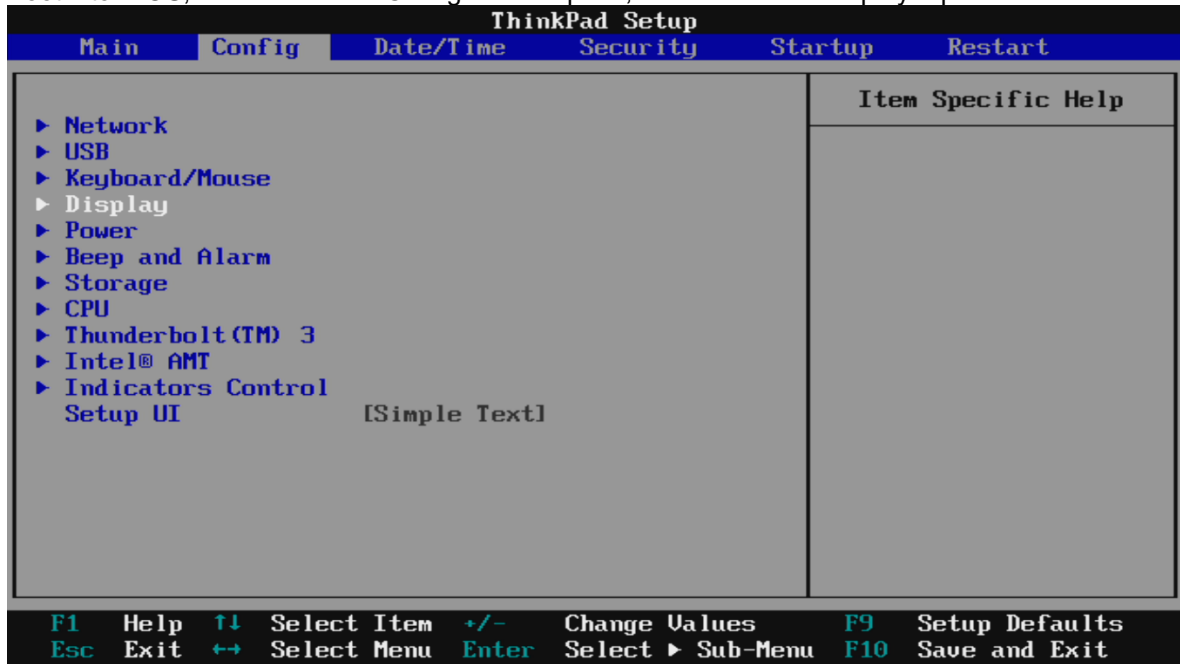
```
                              ThinkPad Setup
      Main      Config      Date/Time      Security     Startup      Restart

                                                        Item Specific Help
  ▶ Boot

    Network Boot                    [PCI LAN]

    UEFI/Legacy Boot                [Both]
      - UEFI/Legacy Boot Priority   [UEFI First]
      - CSM Support                 [Yes]

    Boot Mode                       [Quick]

    Option key Display              [Enabled]

    Boot device List F12 Option     [Enabled]

    Boot Order Lock                 [Disabled]



  F1    Help  ↑↓  Select Item  +/-     Change Values    F9    Setup Defaults
  Esc   Exit  ↔   Select Menu  Enter   Select ▶ Sub-Menu  F10  Save and Exit
```

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

```
                              ThinkPad Setup
      Main      Config      Date/Time      Security     Startup      Restart

                                                        Item Specific Help
  ▶ Boot

    Network Boot                    [PXE BOOT]

    UEFI/Legacy Boot                [Both]
      - UEFI/Leg
      - CSM Supp ┌──────────────────────────────────────────┐
                 │           Setup Confirmation             │
    Boot Mode    │                                          │
                 │  Save configuration changes and exit now?│
    Option key   │                                          │
                 │          [Yes]            [No]           │
    Boot device  └──────────────────────────────────────────┘
                   List F12 Option   [Enabled]

    Boot Order Lock                 [Disabled]



  F1    Help  ↑↓  Select Item  +/-     Change Values    F9    Setup Defaults
  Esc   Exit  ↔   Select Menu  Enter   Select ▶ Sub-Menu  F10  Save and Exit
```

Section 2 – Discrete vs Hybrid Graphics

The Thinkpad P53 and P73 offer both Nvidia and Intel graphics. To run exclusively Nvidia graphics, use the discrete graphics mode highlighted below.

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

```
                          ThinkPad Setup
    Main      Config     Date/Time     Security      Startup      Restart

                                                  Item Specific Help
       ▶ Network
       ▶ USB
       ▶ Keyboard/Mouse
       ▶ Display
       ▶ Power
       ▶ Beep and Alarm
       ▶ Storage
       ▶ CPU
       ▶ Thunderbolt(TM) 3
       ▶ Intel® AMT
       ▶ Indicators Control
         Setup UI            [Simple Text]




    F1   Help   ↑↓  Select Item  +/-    Change Values    F9   Setup Defaults
    Esc  Exit   ←→  Select Menu  Enter  Select ▶ Sub-Menu F10  Save and Exit
```

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

```
                          ThinkPad Setup
              Config

                    Display                      Item Specific Help

    Boot Display Device    [ThinkPad LCD]        Discrete Graphics
    Graphics Device        [Hybrid Graphics]     mode will achieve
    Total Graphics Memory  [256MB]               higher graphics
                    * Unselectable when          performance.

                        Discrete Graphics        Hybrid Graphics mode
                        Hybrid Graphics          runs as Integrated
                                                 Graphics mode to
    Boot Time Extension    [Disabled]            achieve longer
                                                 battery life, and
                                                 Discrete Graphics is
                                                 enabled on demand.




    F1   Help   ↑↓  Select Item  +/-    Change Values    F9   Setup Defaults
    Esc  Exit   ←→  Select Menu  Enter  Select ▶ Sub-Menu F10  Save and Exit
```

Section 3 – Installing Debian 10.x

Please refer to the following instructions and screenshots on how to install Debian 10 on the Lenovo Thinkpad P53 and P73.

- 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.
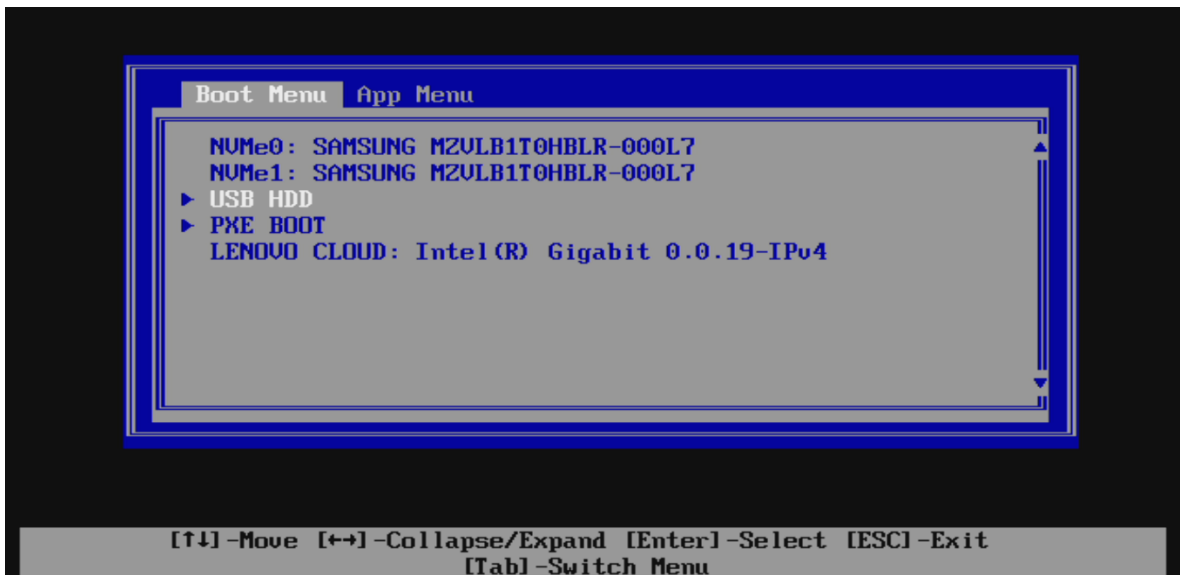
- Highlight "Graphical install" from the Debian boot menu and press 'E' to edit.
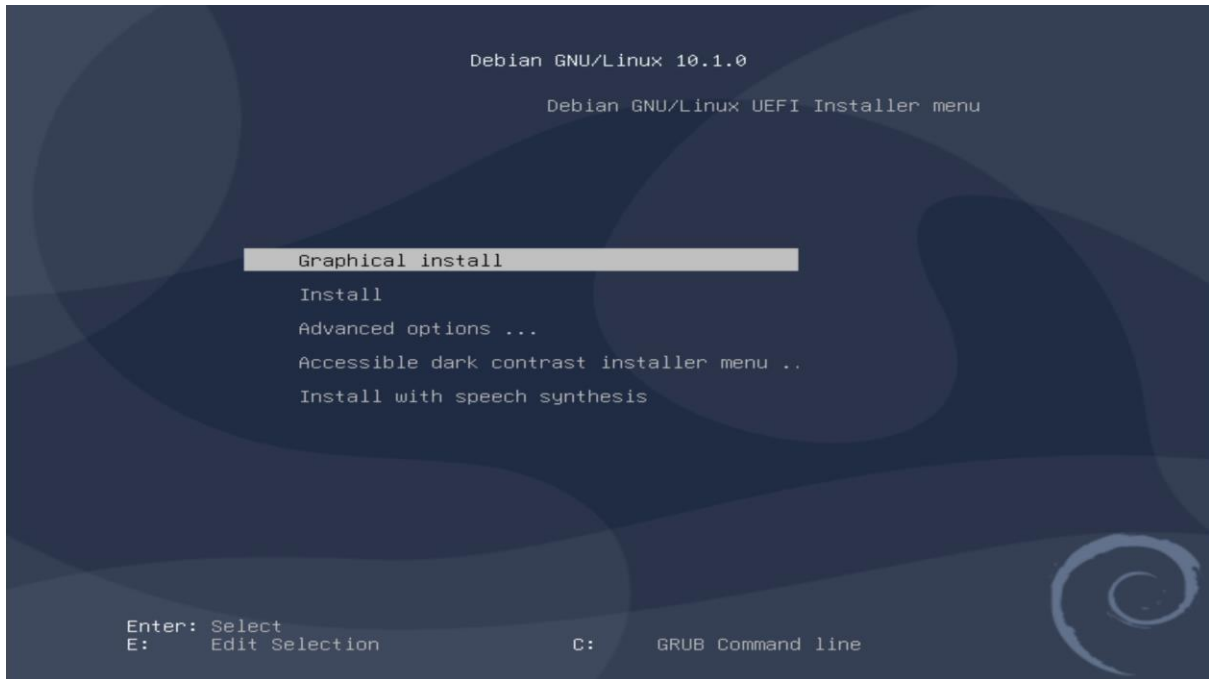
- Add the following line, "*psmouse.elantech_smbus=0*" before "quiet", then press "Ctrl+x".
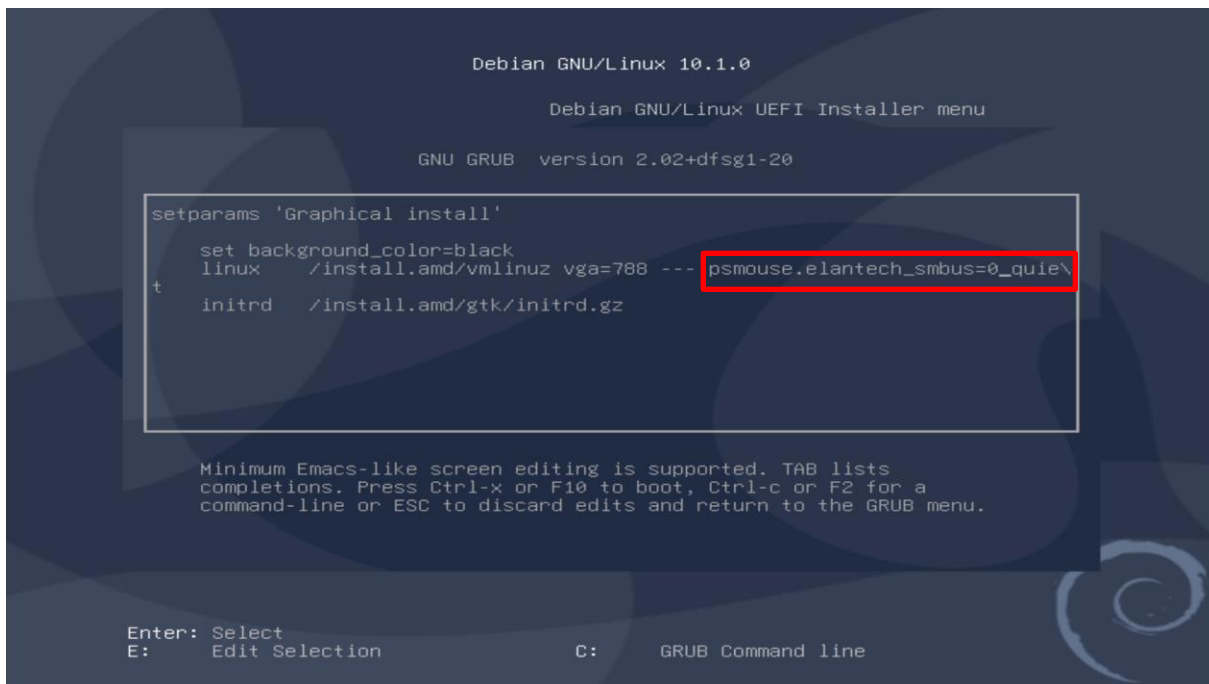
- Select the appropriate language and "Continue".

- Continue to personalize options.
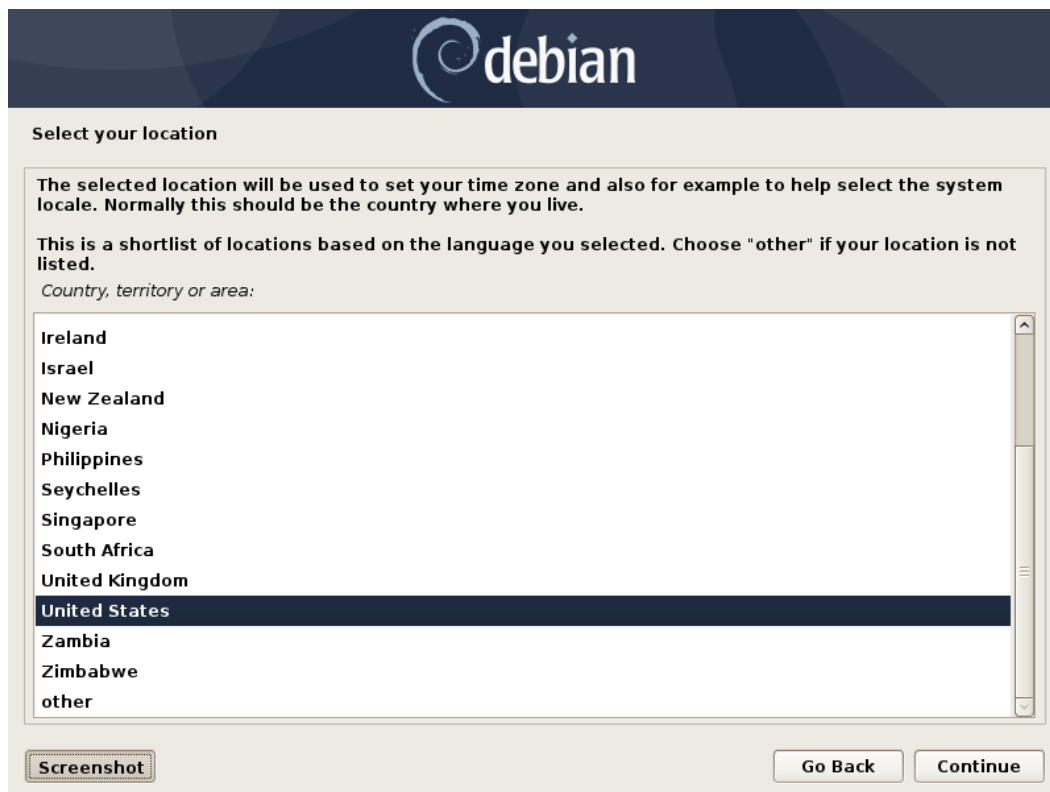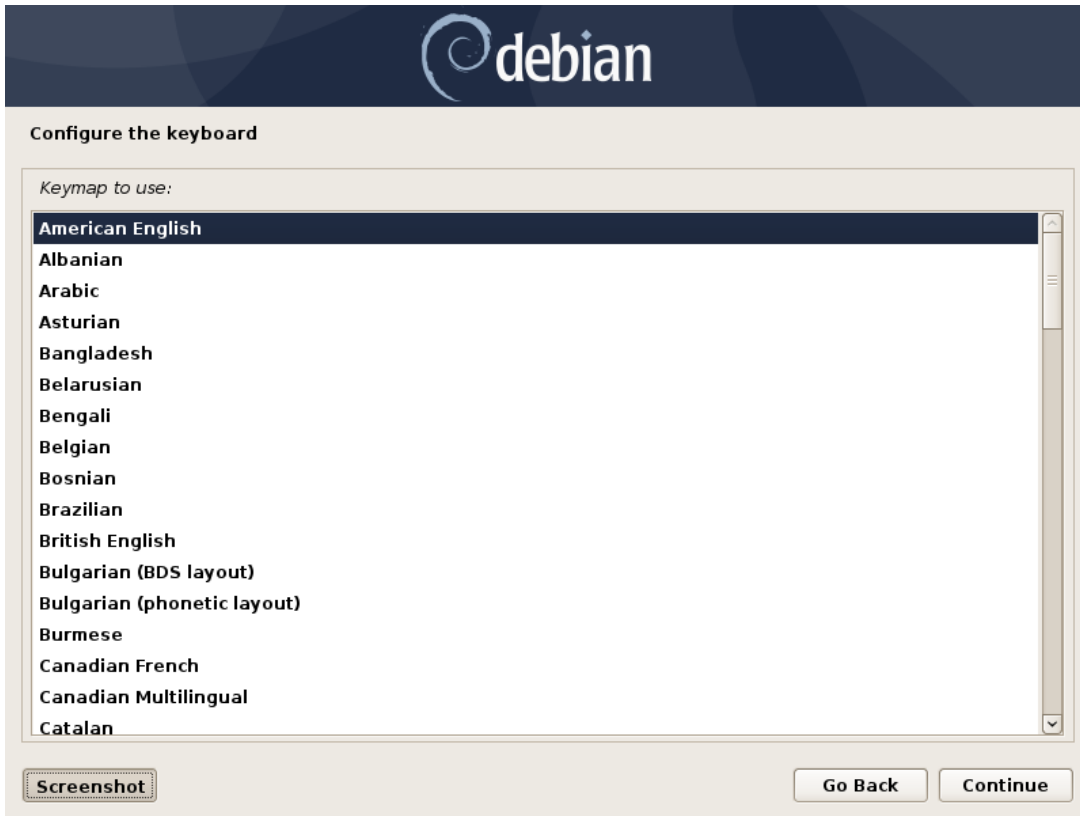
- Set the desired root password
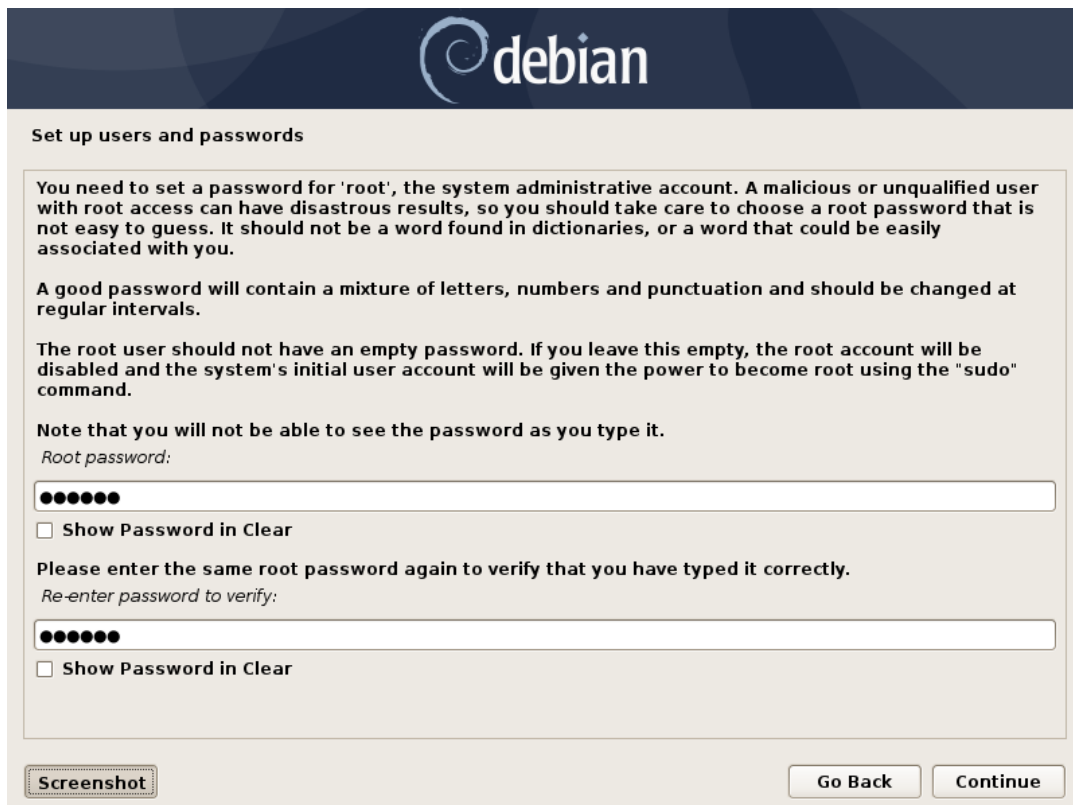
- Set the desired user name.

- Set the password for the user.

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

- Choose "Guided – use entire disk" partitioning method.
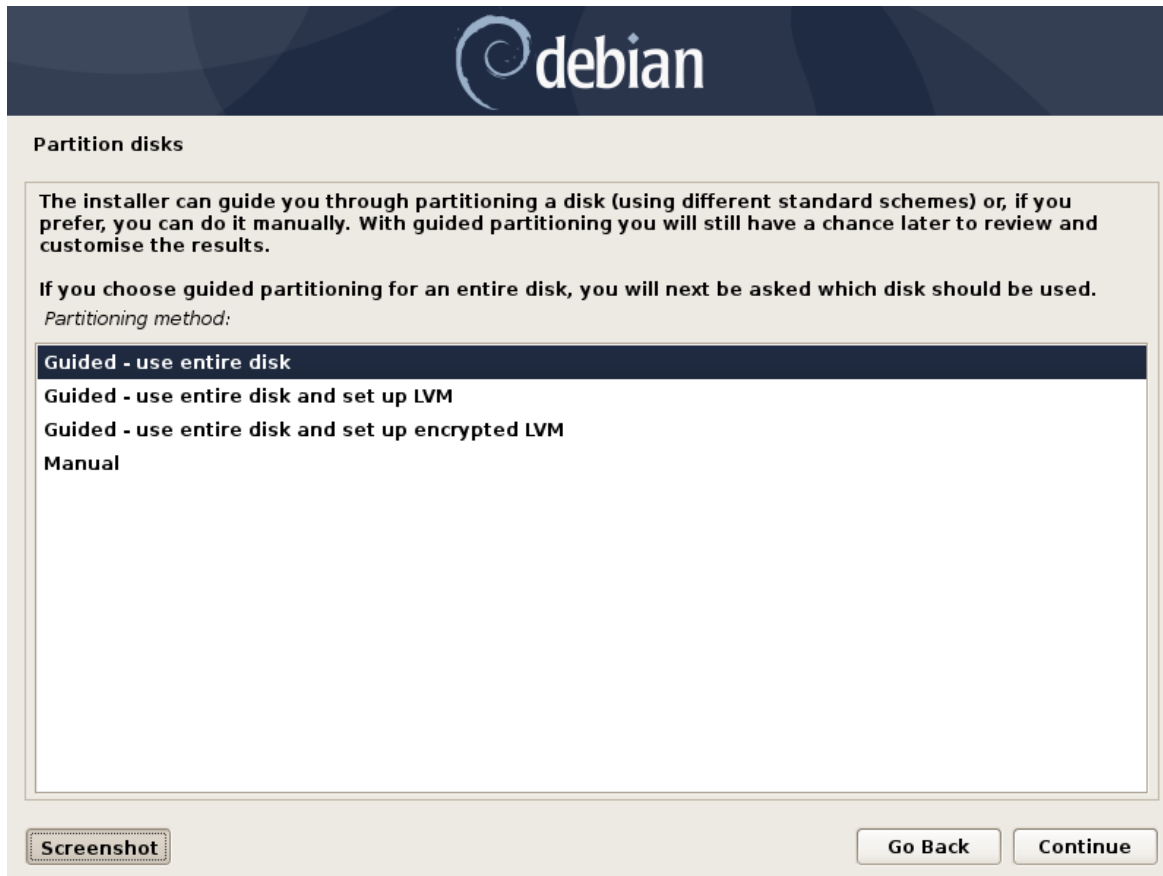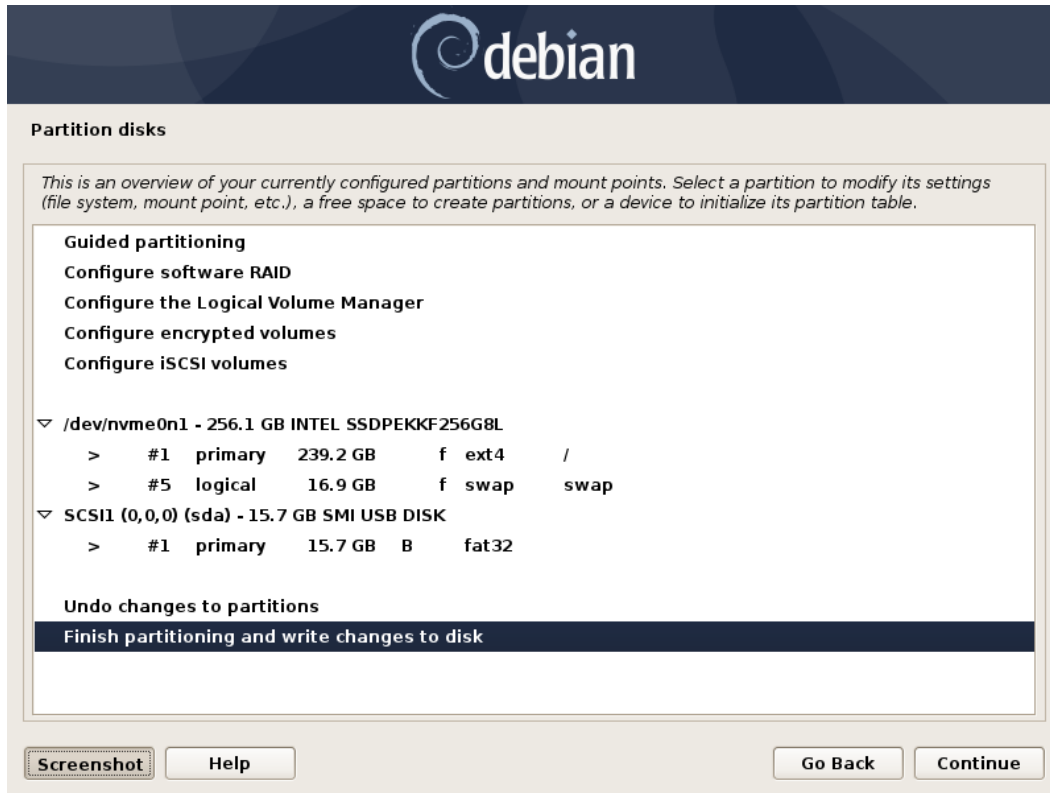
- Select the storage device on which to install the operating system.
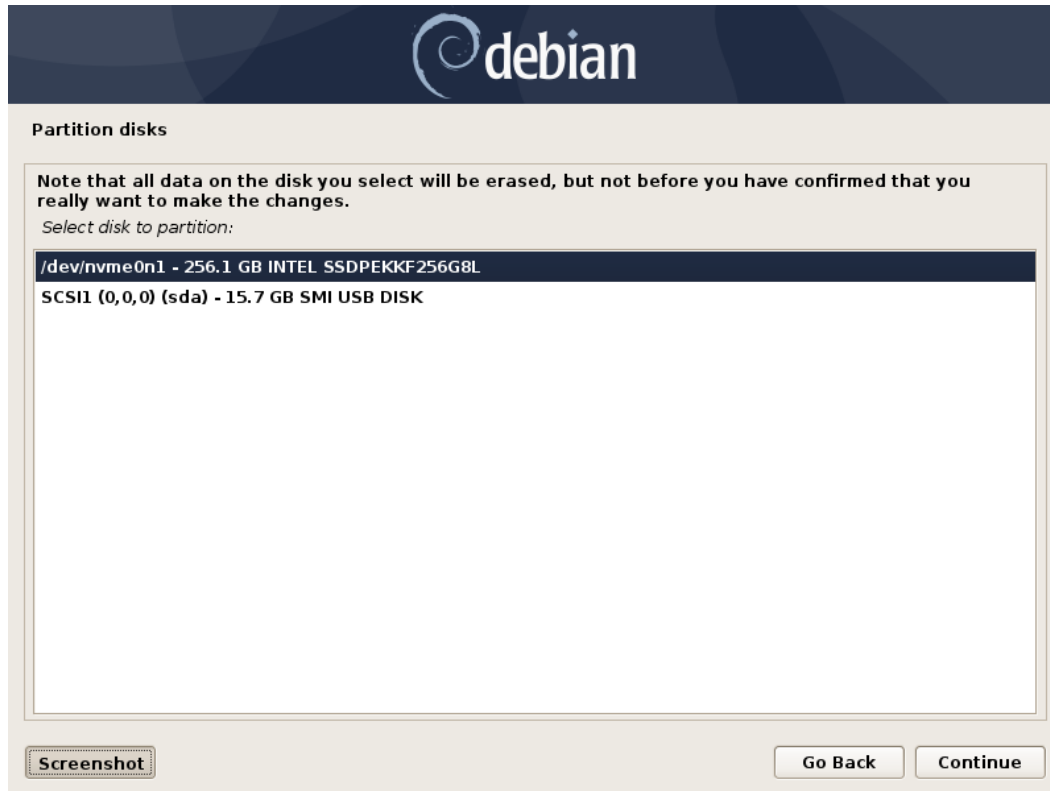
- Chose "All files in one partition…" as the partitioning scheme.
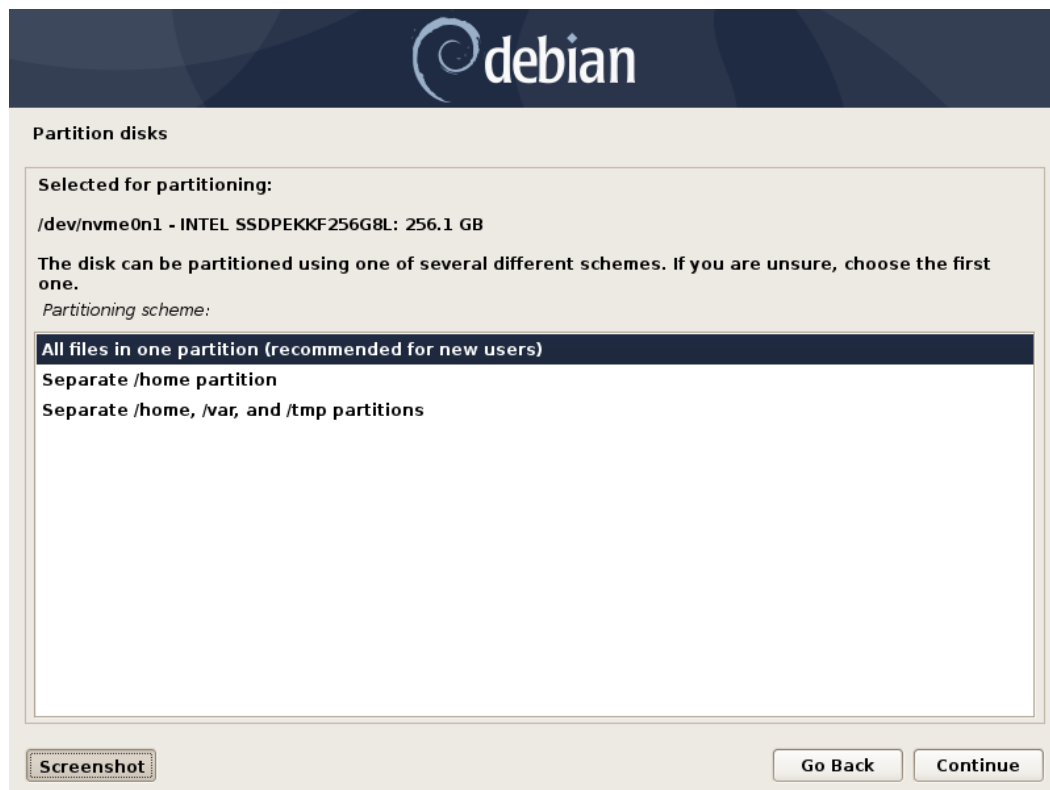
- Choose to "Finish partitioning and write changes to disk"

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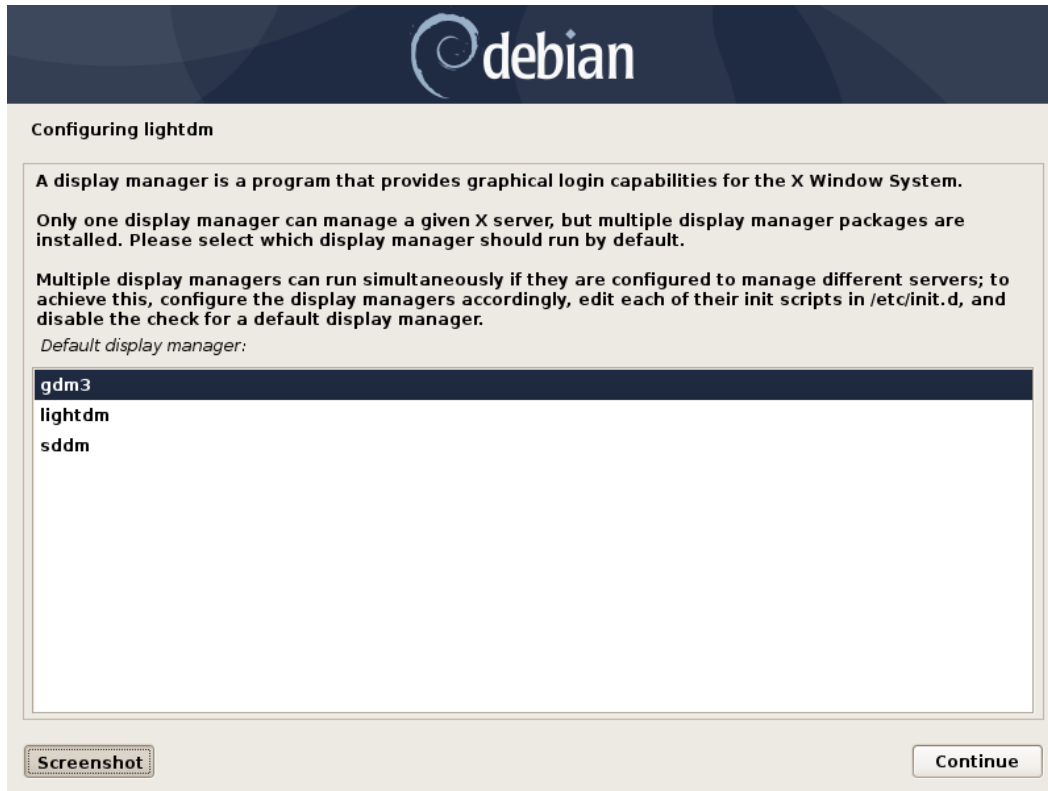
- Select "Yes" to install the GRUB boot loader to the master boot record.

- Select the boot disk for boot loader installation.
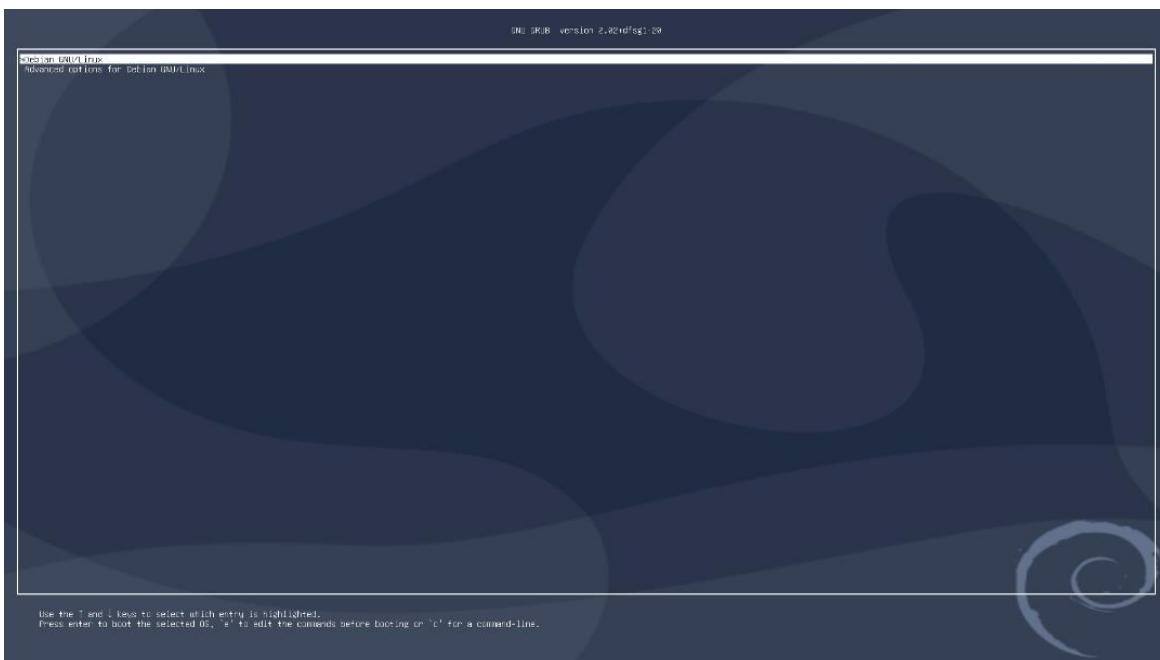
- After reboot highlight "Debian GNU/Linux" from the GRUB boot options and press 'e'

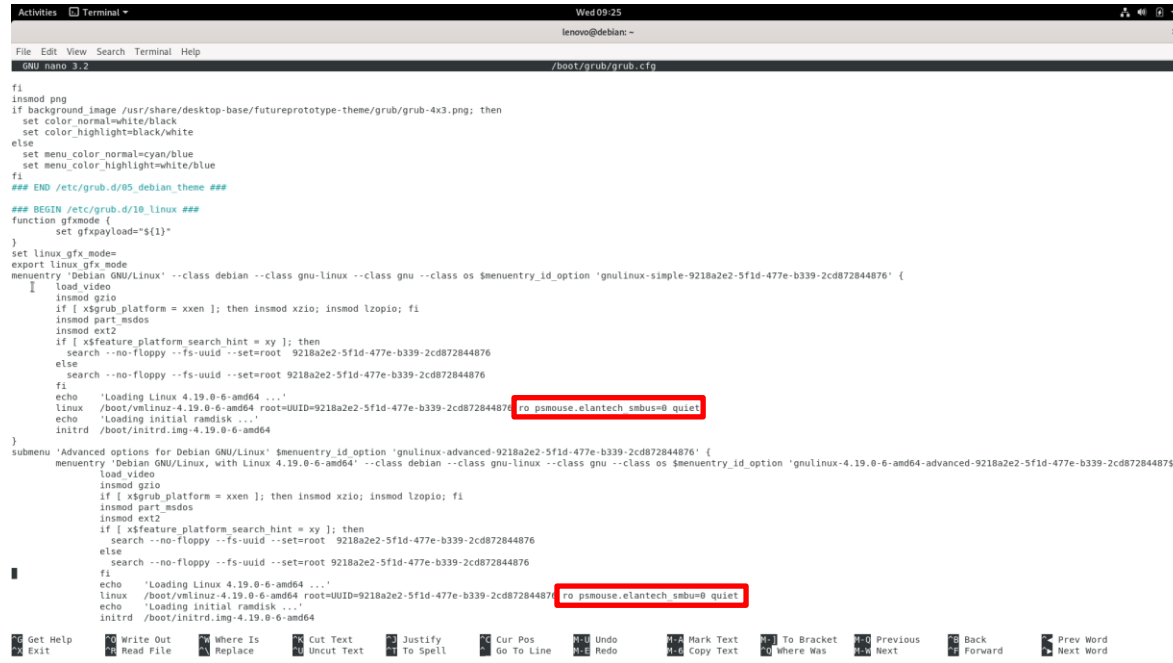- Add "psmouse.elantech_smbus=0" before "quiet", then press "ctrl+x".

- Log in to the Debian desktop.
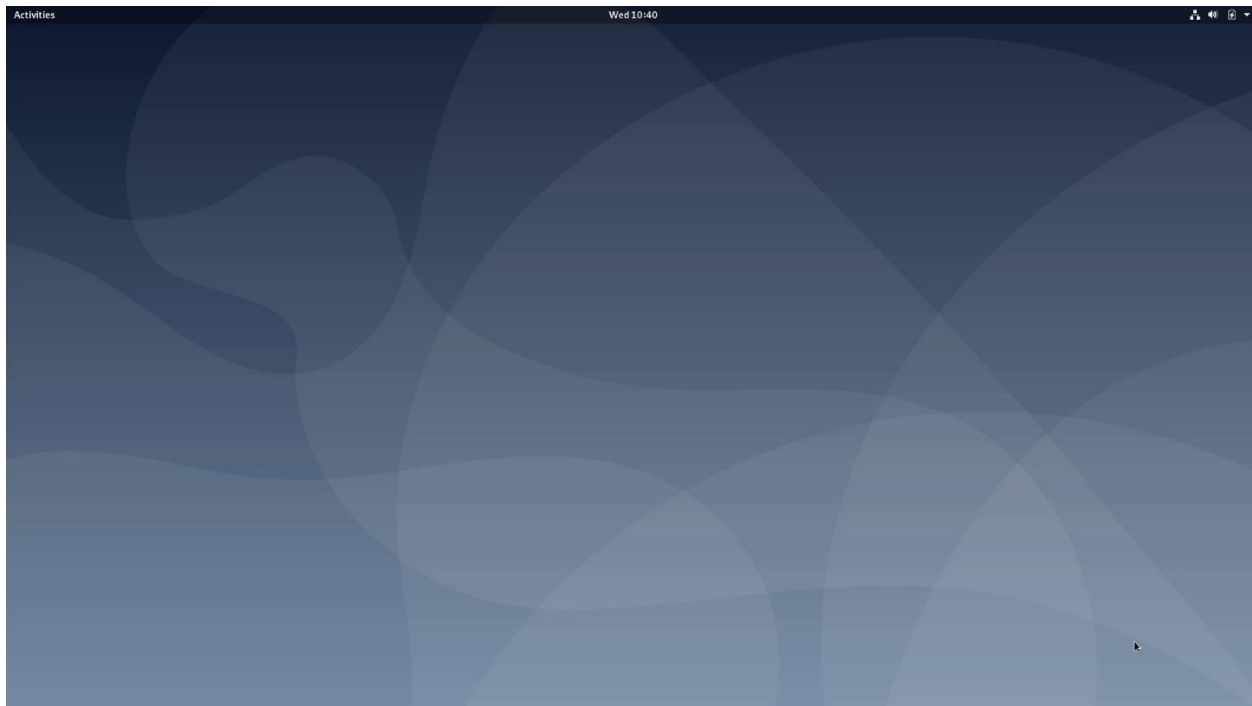
Section 4 – TrackPoint and Touchpad Workaround

The TrackPoint and touchpad driver is not native to the Debian 10 kernel, so users will not be able to use the TrackPoint or touchpad by default. The following method can be used to enable these devices on a ThinkPad P53 and P73.

Step 1: Upon startup, highlight "Debian GNU/Linux" from the GRUB boot options and press 'e'.
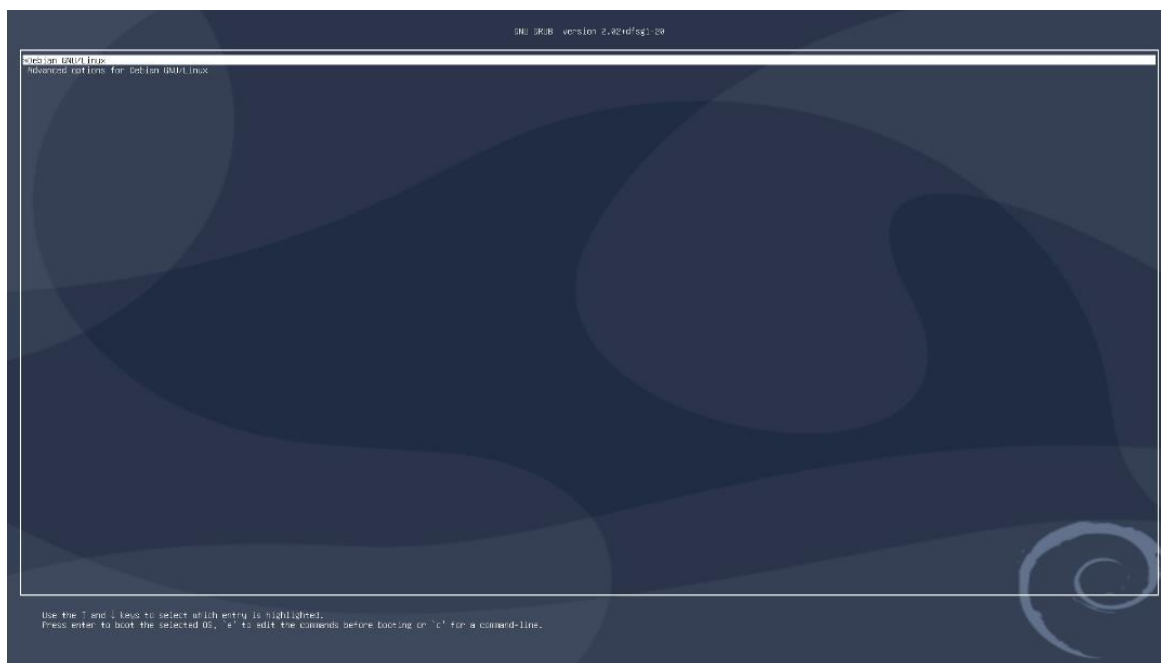
Step 2: Add "psmouse.elantech_smbus=0" before "quiet", then press "ctrl+x".

Step 3: After booting into Debian edit the grub.cfg file.

su –

nano /boot/grub/grub.cfg

- Add the line "psmouse.elantech_smbus=0" at these locations.

- Press "ctrl + x" and save the file.

Step 4: Reboot the system and now the TrackPoint and touchpad should work as expected.

Section 5 – 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 P53 and P73.

Option 1: Update the *iwlwifi* 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
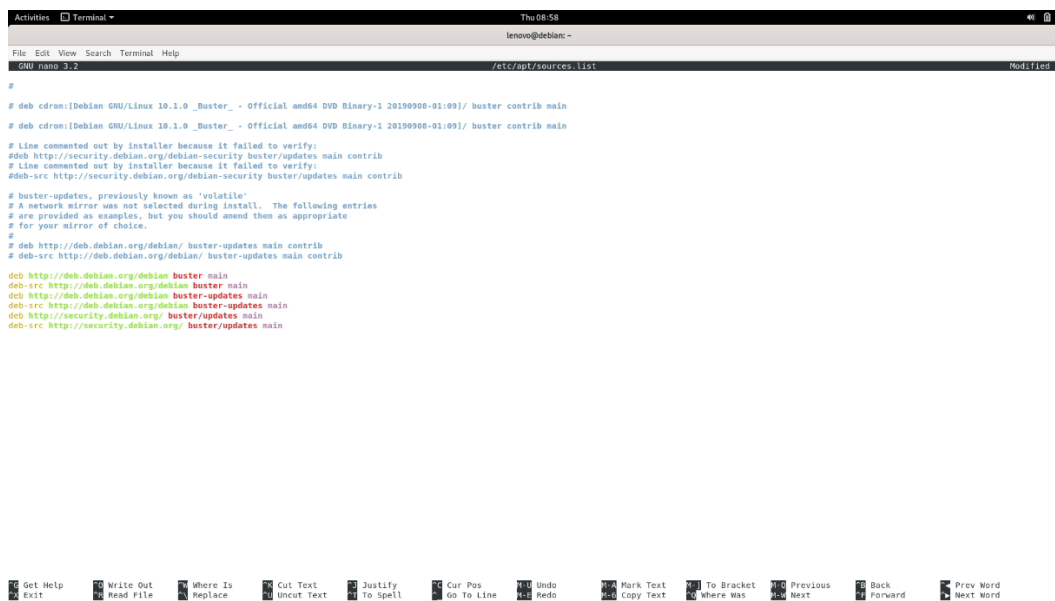
    deb *http://deb.debian.org/debian buster main*

    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*

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_IWLMVM_VENDOR_CMDS=y/# CPTCFG_IWLMVM_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 zxf 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 6 – 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 nvidia.com/drivers.

Step 2: Open a terminal window and stop x-windows.

init 3
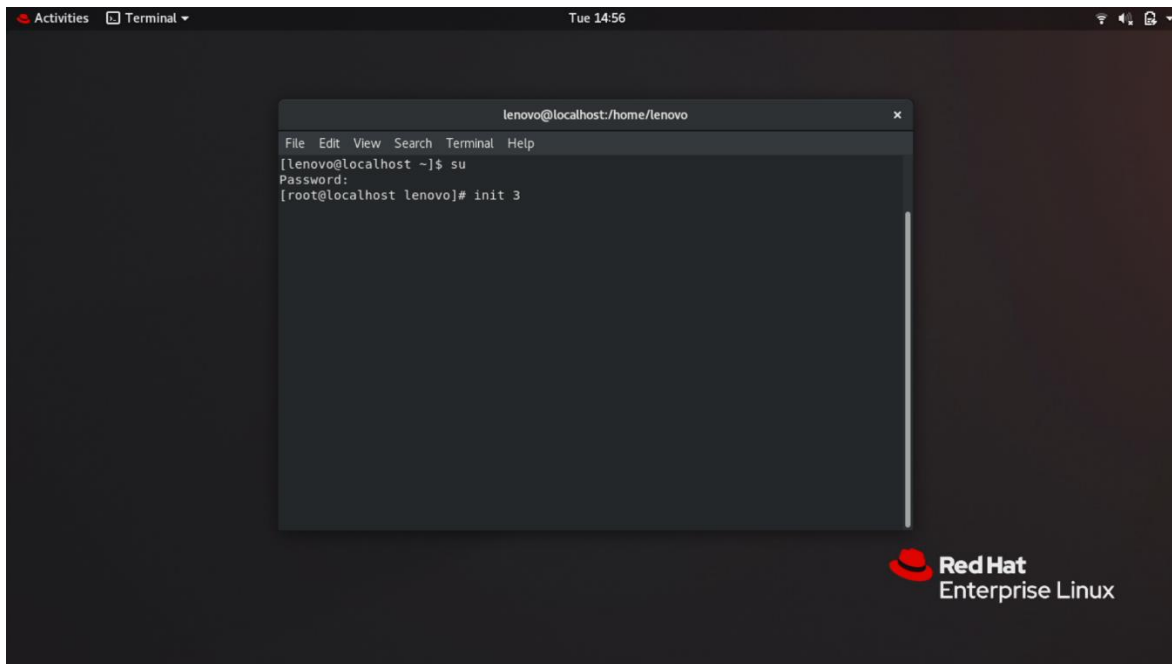
Step 3: Login and browse to the directory location to where the Nvidia driver installer is.

```
Debian GNU/Linux 10 debian tty1

debian login: lenovo
Password:
Last login: Wed Dec 18 13:53:01 EST 2019 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 4: Make the Nvidia installer an executable.

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

```
Debian GNU/Linux 10 debian tty1

debian login: lenovo
Password:
Last login: Wed Dec 18 13:53:01 EST 2019 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$ chmod +x NVIDIA-Linux-x86_64-440.44.run
lenovo@debian:~/Downloads$ _
```

Step 5: Run the Nvidia driver executable as root.

su -

./NVIDIA-Linux-x86_64*

```
lenovo@debian:~/Downloads$ su
Password:
root@debian:/home/lenovo/Downloads# ./NVIDIA-Linux-x86_64-440.44.run _
```

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

```
          NVIDIA Accelerated Graphics Driver for Linux-x86_64 (440.44)



   Install NVIDIA's 32-bit compatibility libraries?
                        Yes                              No






   NVIDIA Software Installer for Unix/Linux              www.nvidia.com
```

Step 7: Select to "Install and overwrite" libglvnd libraries.

Step 8: Nvidia driver installing progress bar may appear.

Step 9: Select "Yes" to update the X-configuration file to use the Nvidia X driver.
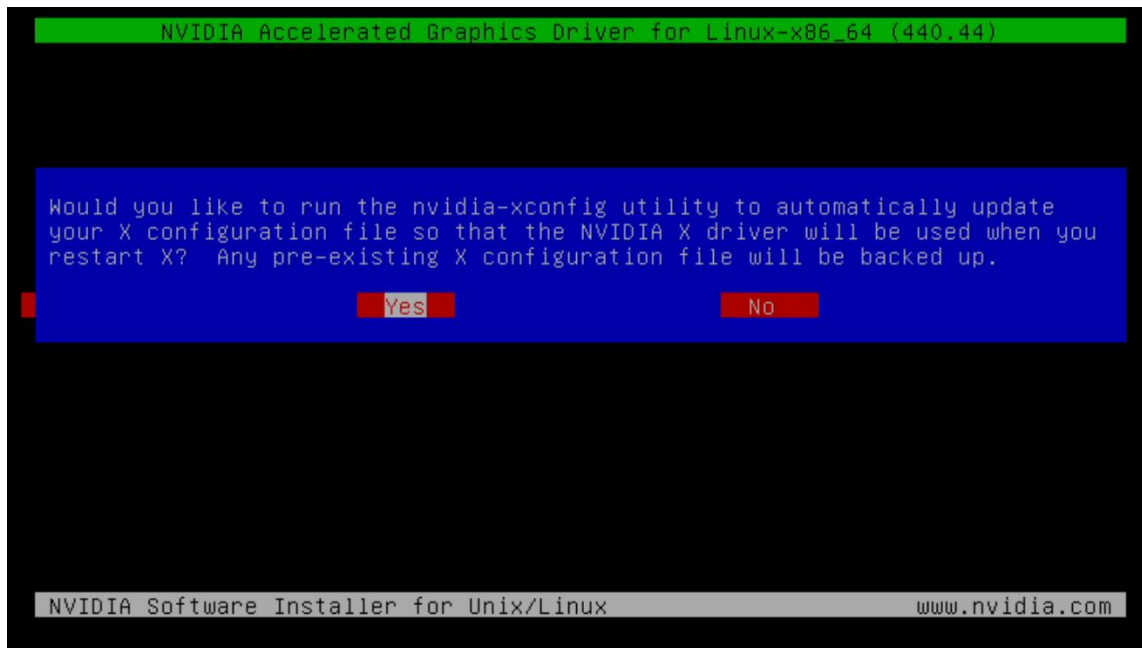
Step 10: Select "OK" to acknowledge the driver installation is complete.
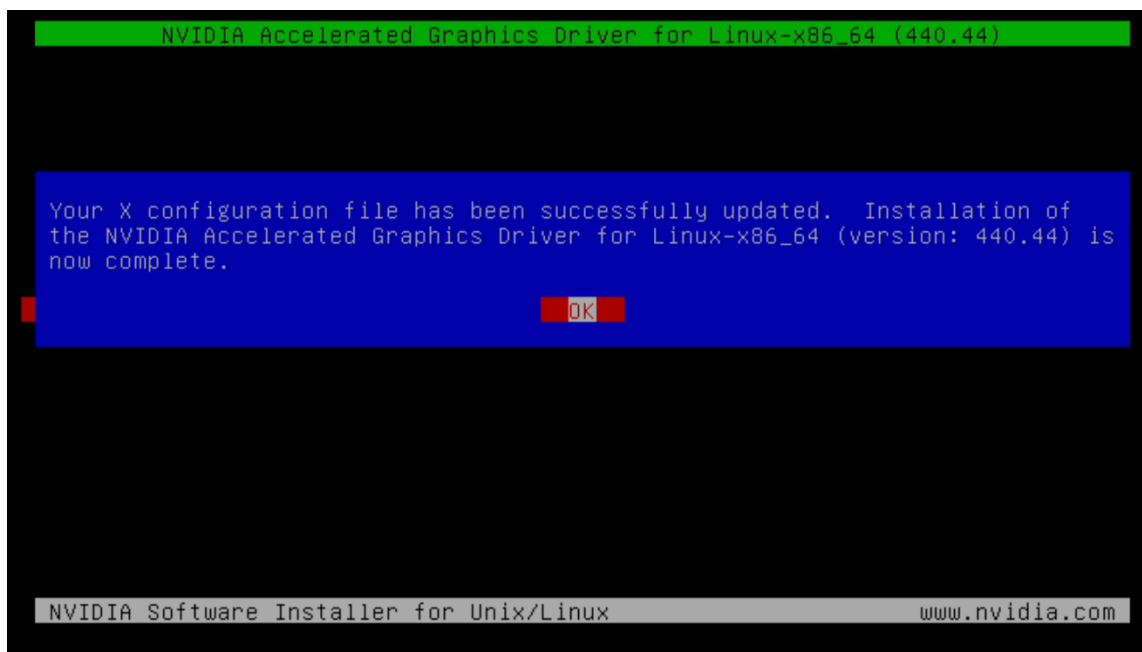
Step 11: Execute the following command to verify the Nvidia driver is loaded.

nvidia-smi

Step 12: Reboot the system.

Section 7 – Revision History

Version	Date	Author	Changes/Updates
1.0	12/20/2019	Hady Asad	Initial launch release