Debian Linux 10 Installation

Lenovo ThinkStation P620

Contents

Lenovo

Section 1– BIOS Setup & 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.
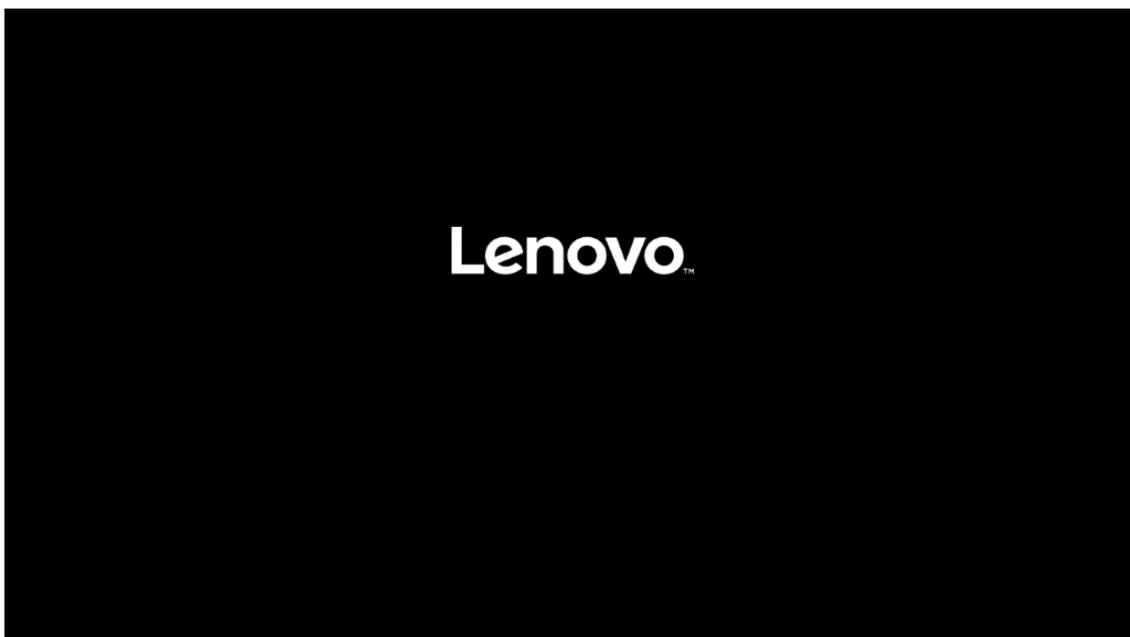
- On the "Security" menu tab, scroll down and select the "Secure Boot" option.
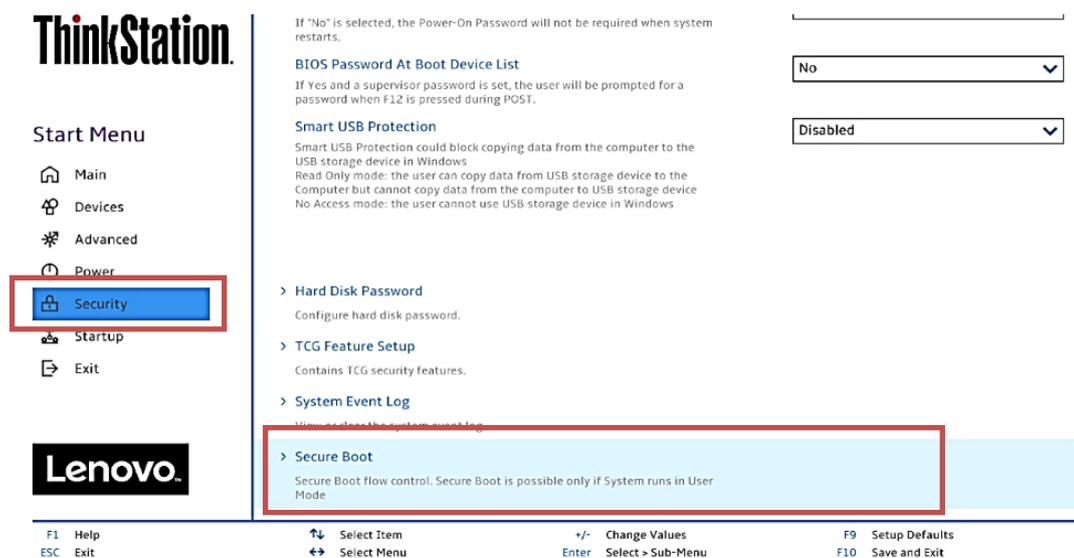
- Check whether Secure Boot is disabled. If found enabled, disable it.
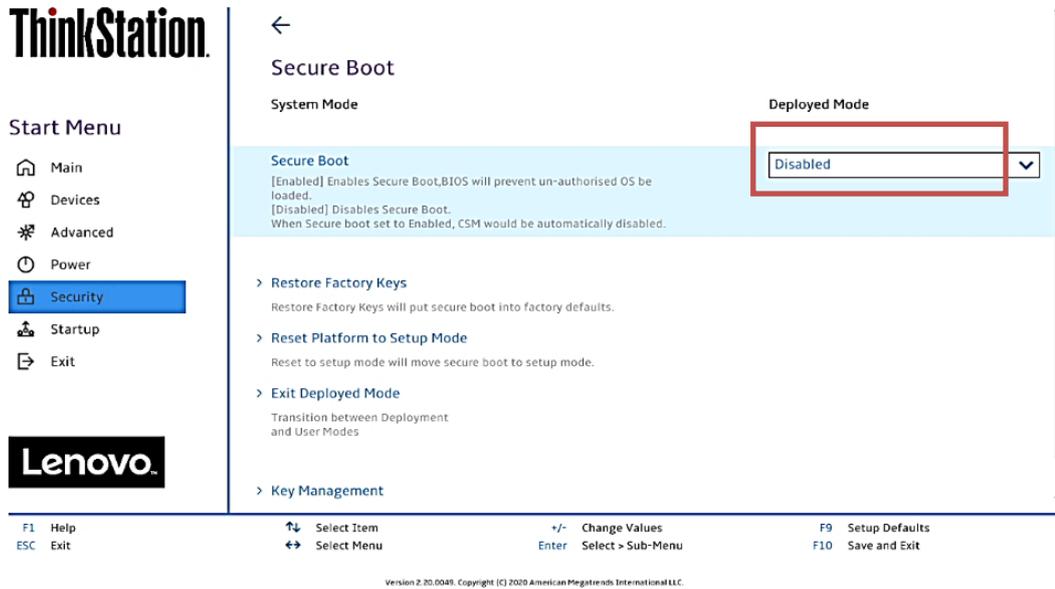
- Save changes by pressing F10 function key.
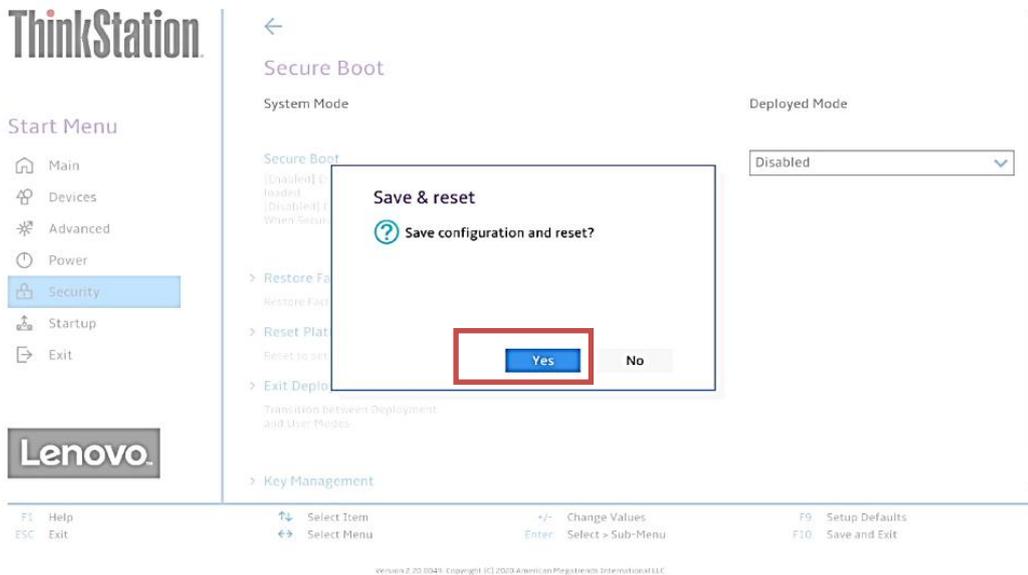
Section 2 – Installing Debian 10.03

Please refer to the following instructions and screenshots on how to install Debian 10.03 on the Lenovo ThinkStation P620.

- Insert the Debian 10.03 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.
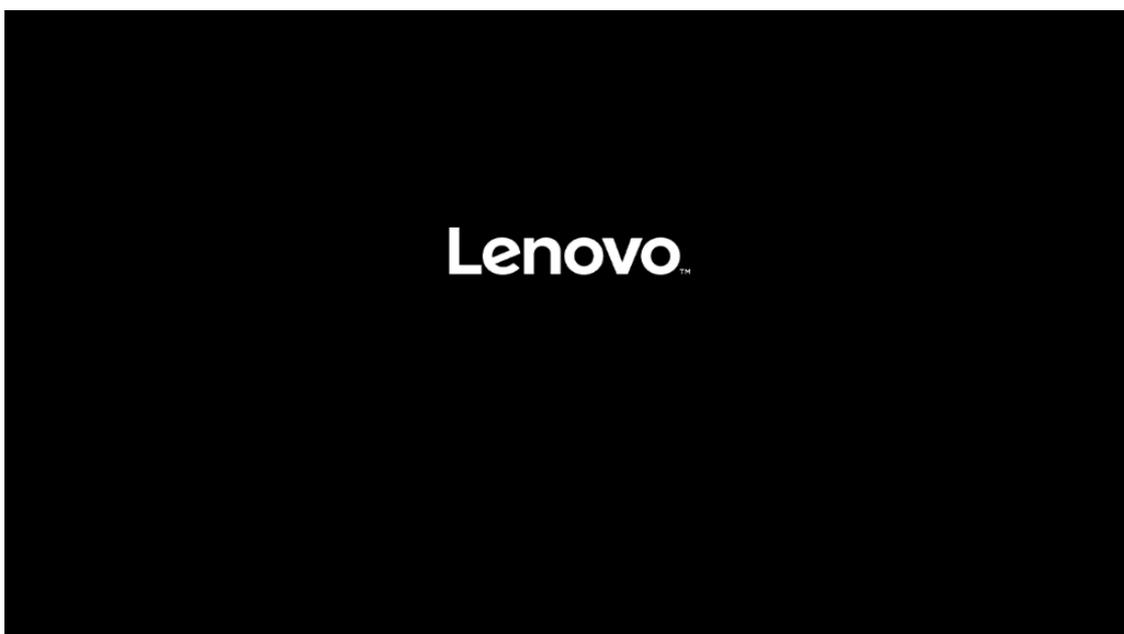
- Select the Linux bootable installation media from the F12 boot menu list.
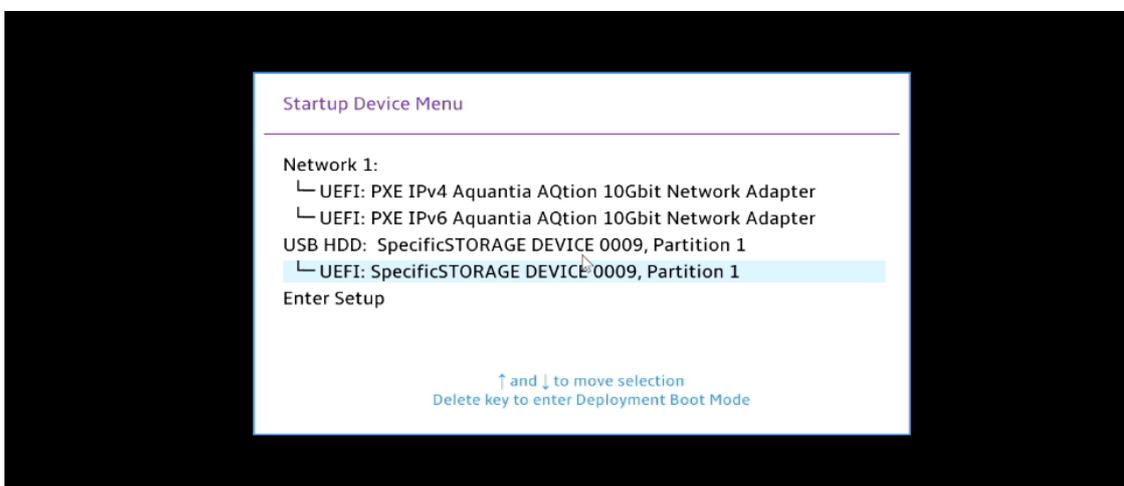
- Highlight Install Ubuntu from the GRUB boot menu and hit enter.
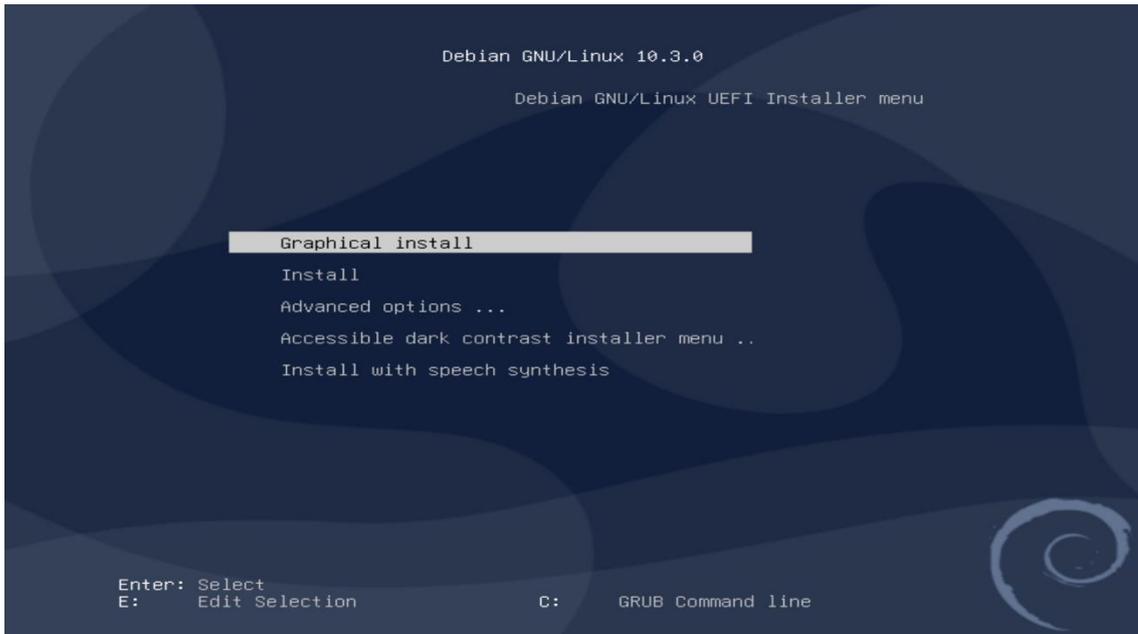
- Select the appropriate language and press Continue.
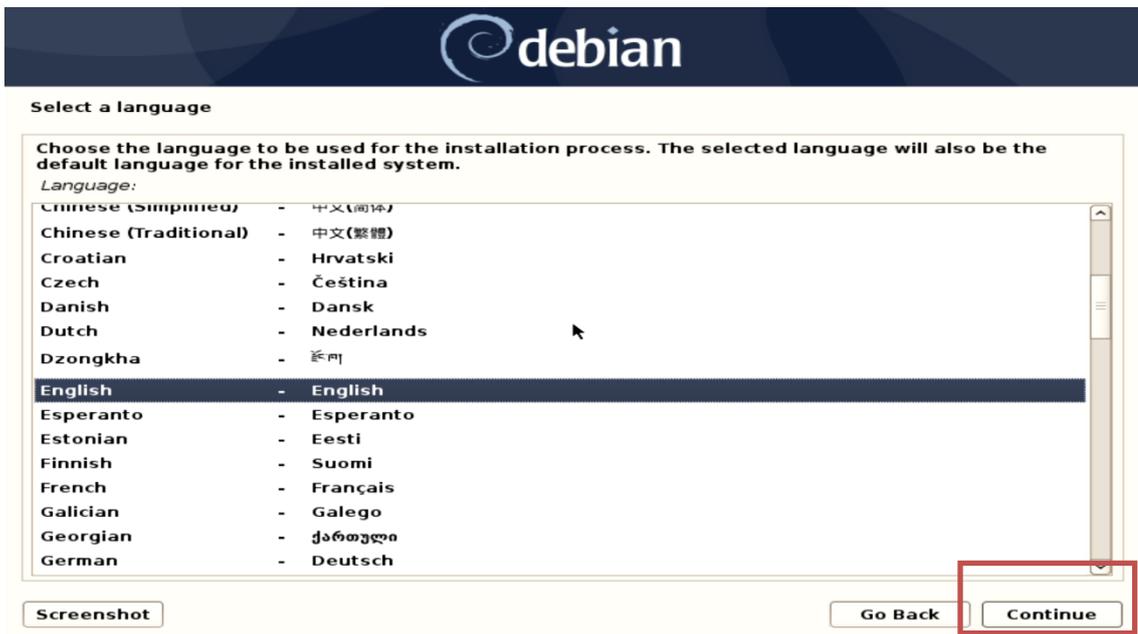
- Select the user location and press Continue.
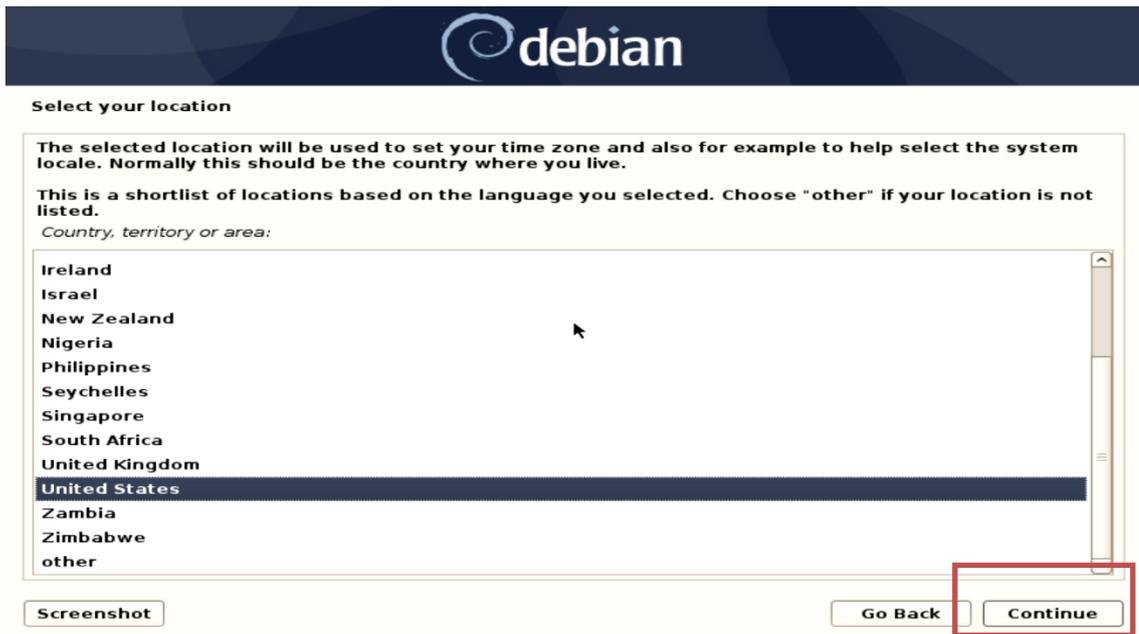
- Configure the keyboard by choosing the appropriate keyboard language and press Continue.
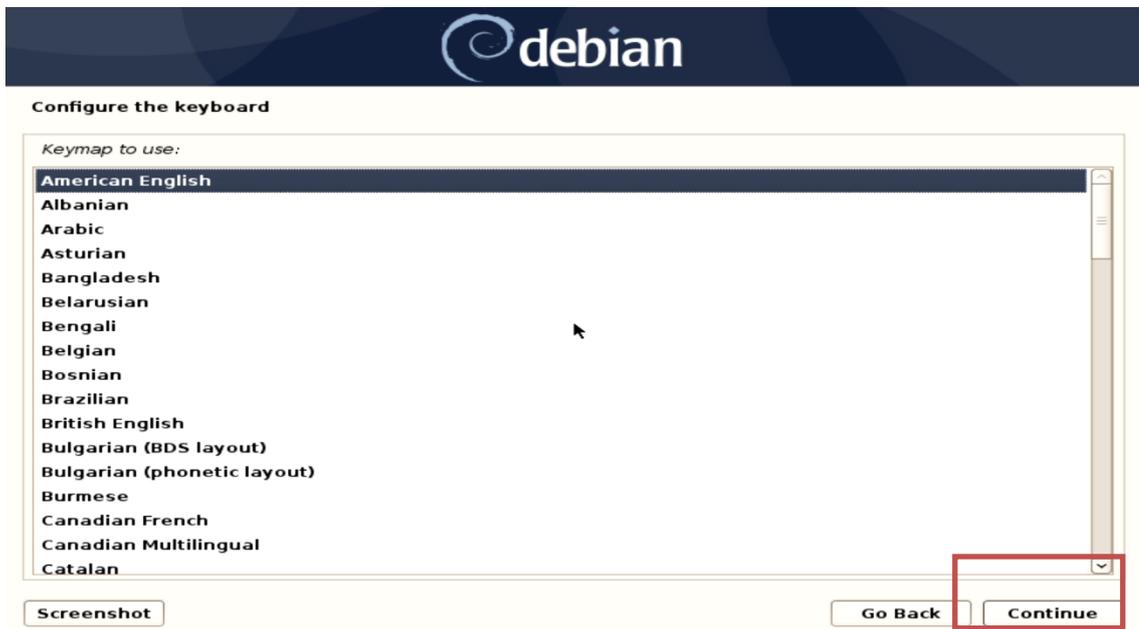
- Enter a hostname for the system and select Continue.
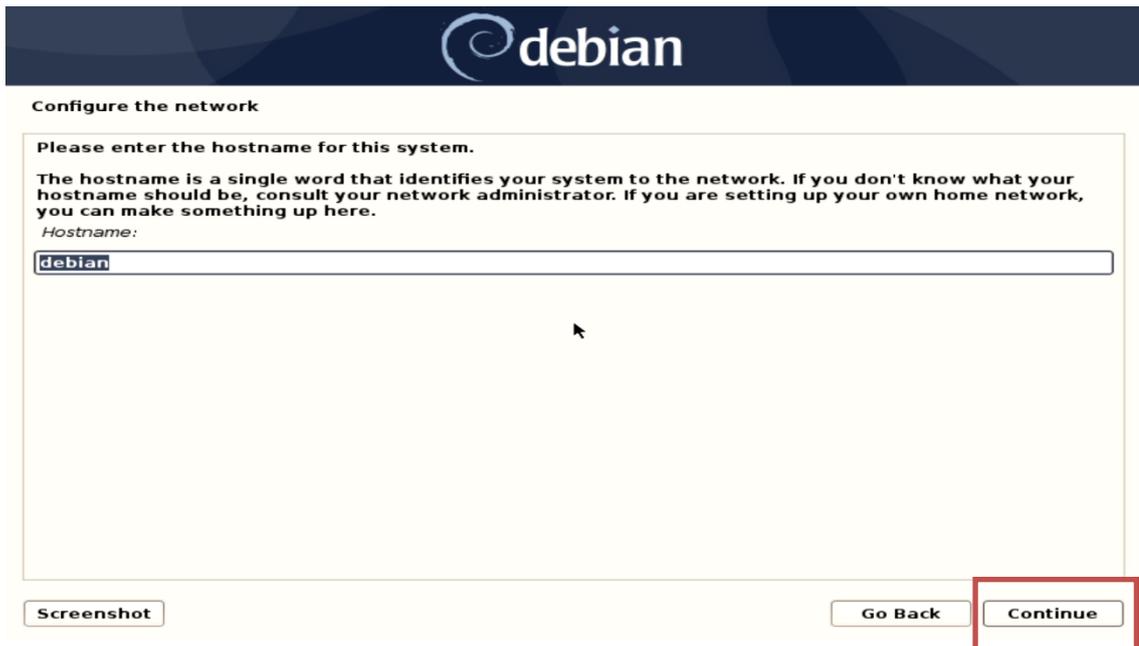
- Enter a domain name and select Continue.

- Set a root password and select Continue.

- Enter full name for the user and select Continue.

- Enter a username to create a user and press Continue.

- Create a strong password for the newly created user and press Continue.
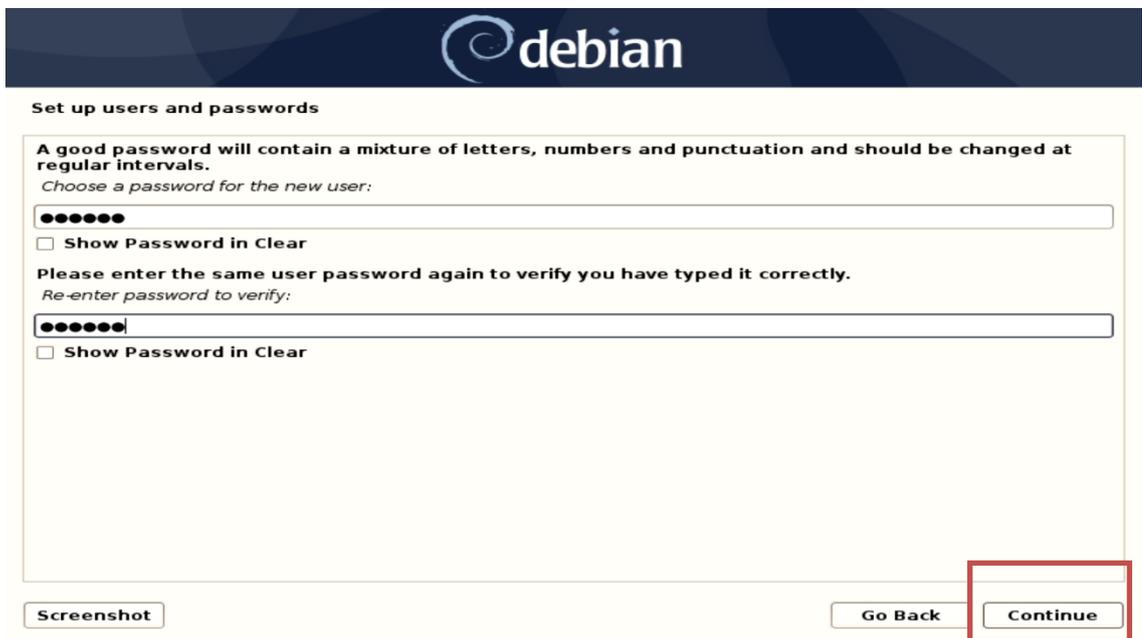
- Select an appropriate time zone to configure the clock and press Continue.

- Select "Yes" for force UEFI installation and select Conitnue.
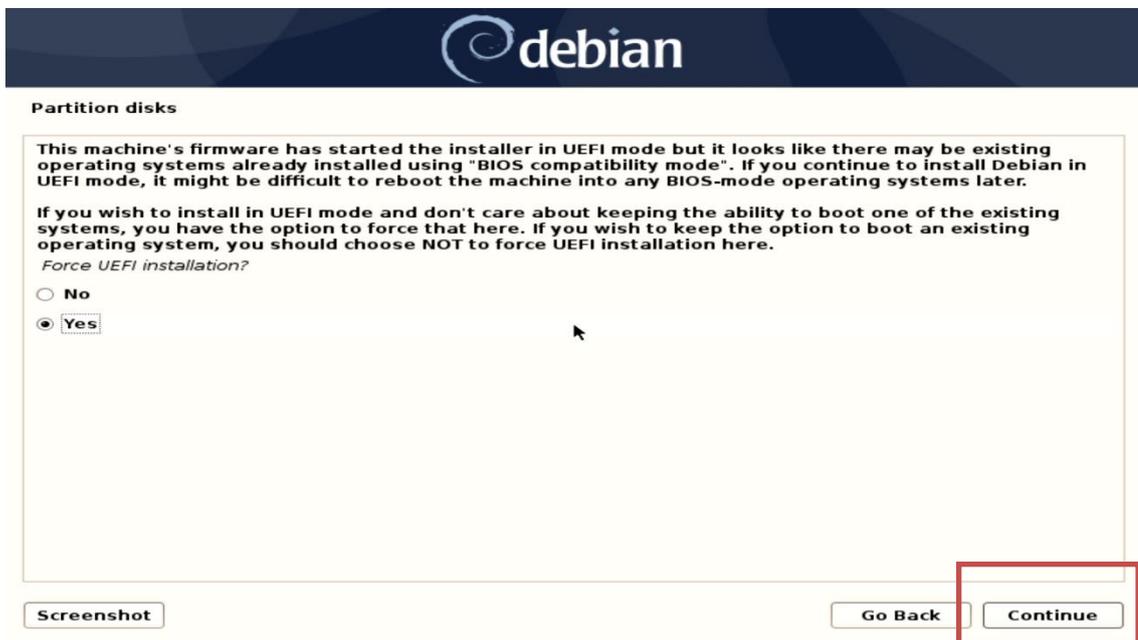
- Choose an appropriate option for partitioning the disk. If the user selects "Guided – use entire disk", Debian will erase the content and use the entire disk for OS installation.
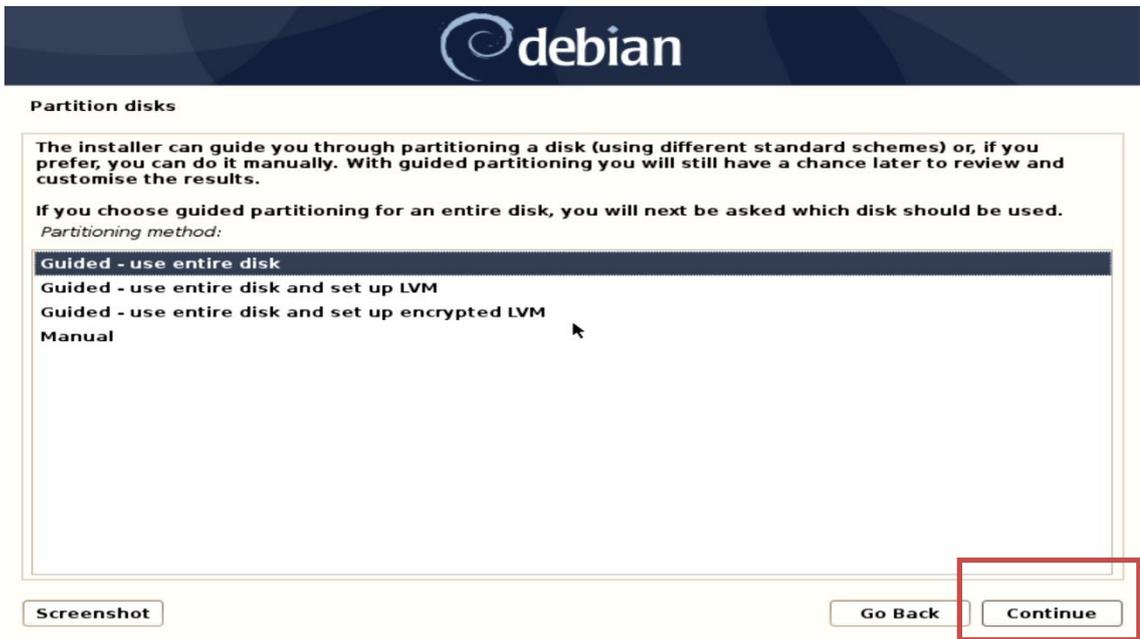
- Select disk to partition and press Continue.
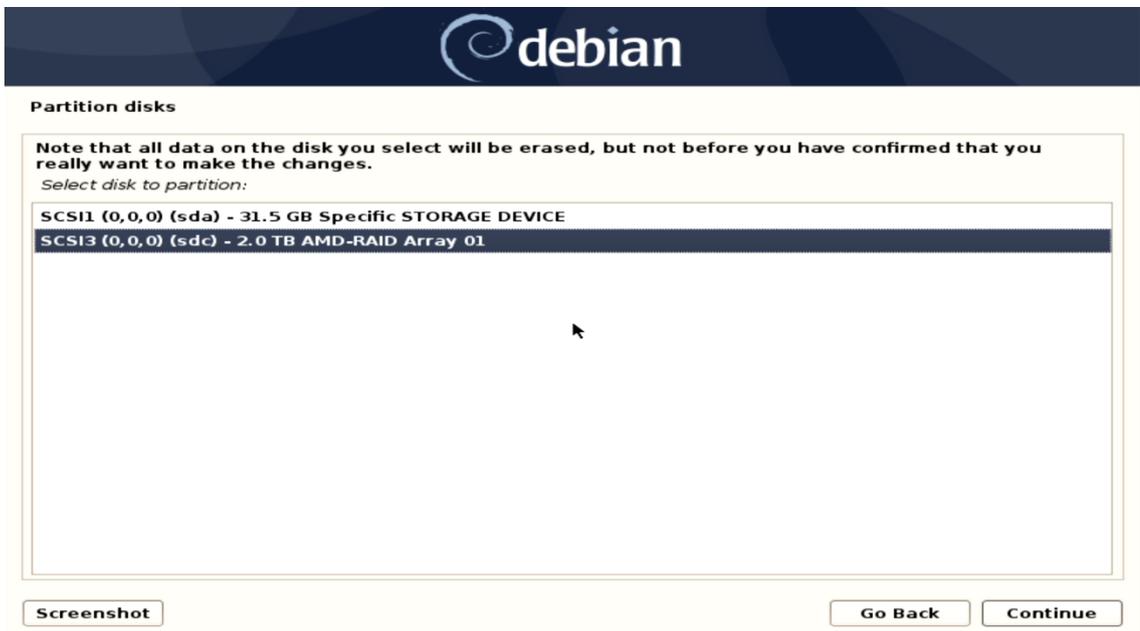
- Select "All files in one partition" and press Continue.
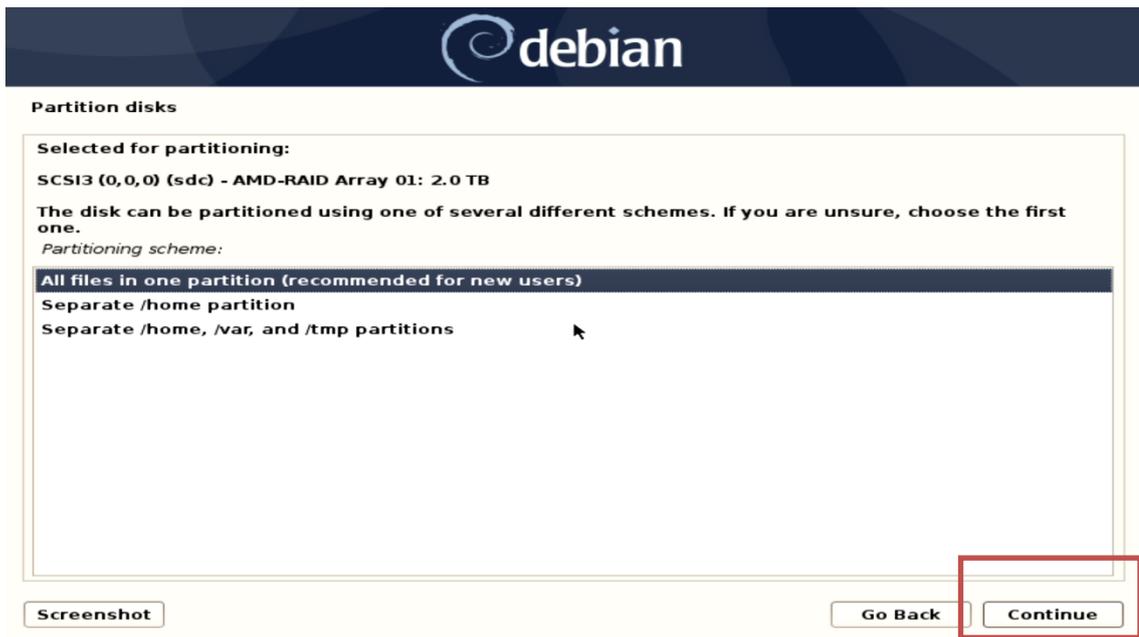
- Select "Finish partitioning and write changes to disk" option after confirming the partitions and press Continue.
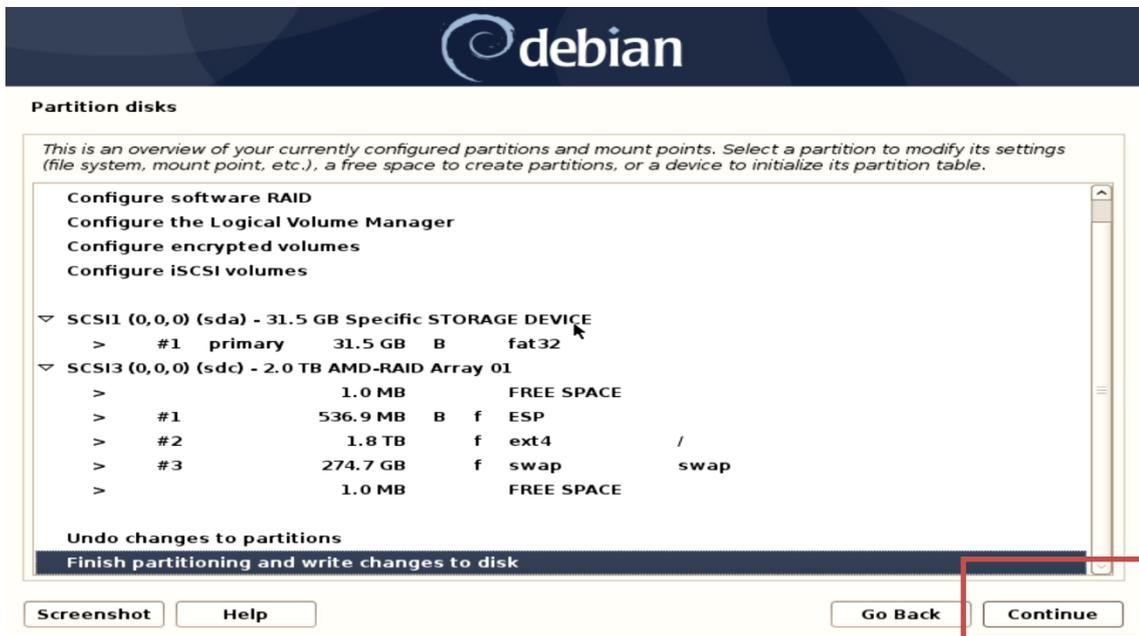
- Select "Yes" to write changes to the disk and press Continue.
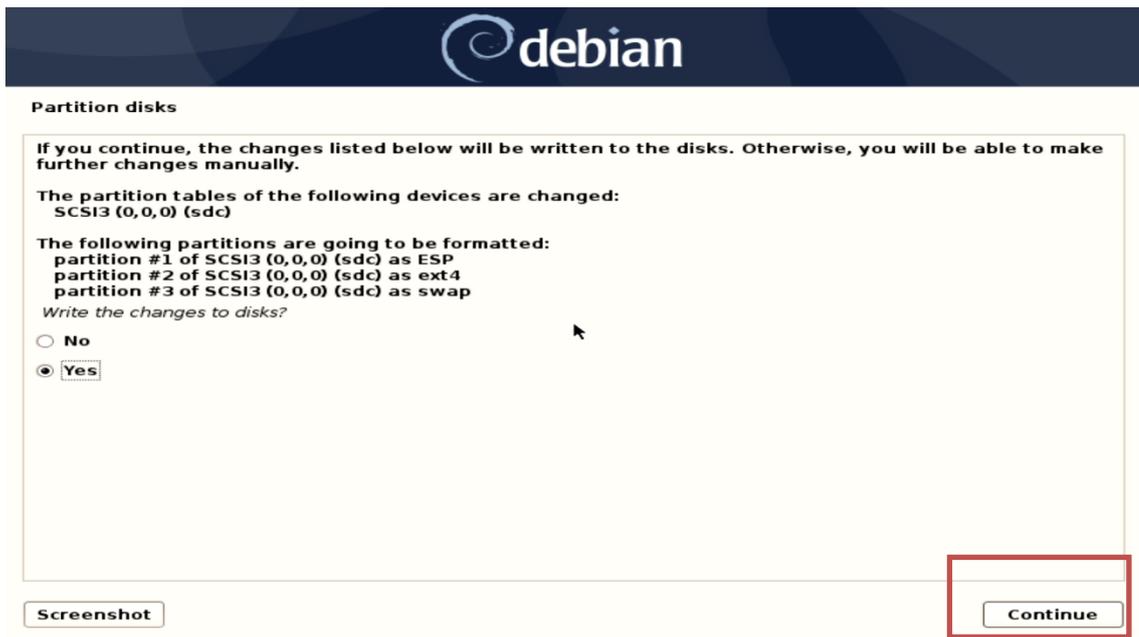
- Select "No" for network mirror and select Continue.
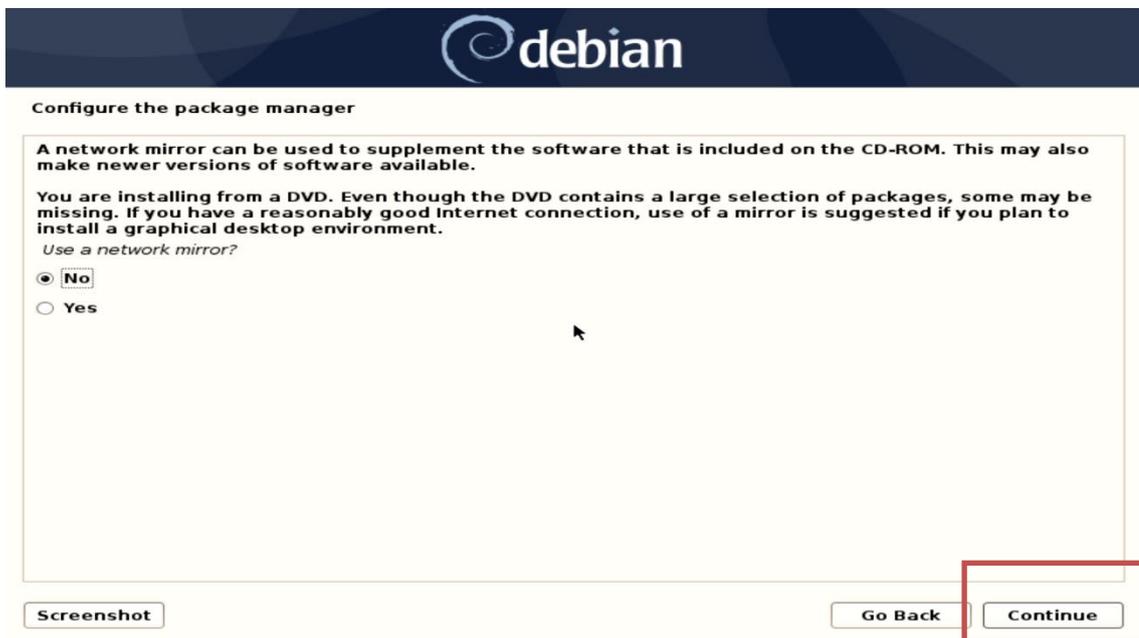
- Choose to participate or not in the package usage survey and press Continue.
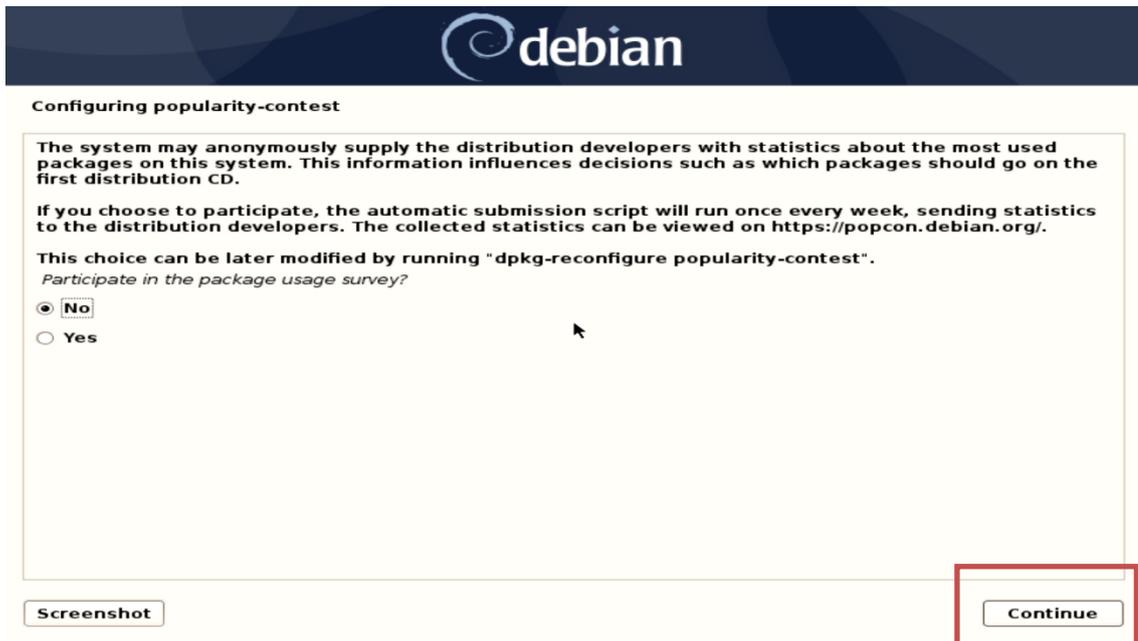
- Choose software to install from the list of software and press Continue.
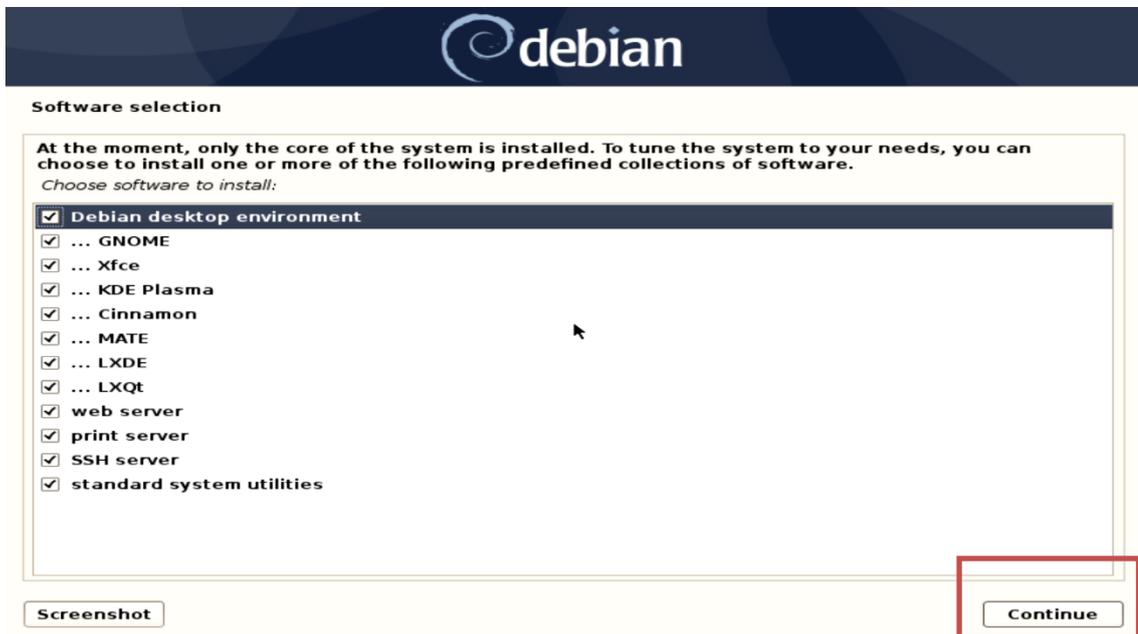
- Select the package manager of choice and press Continue.
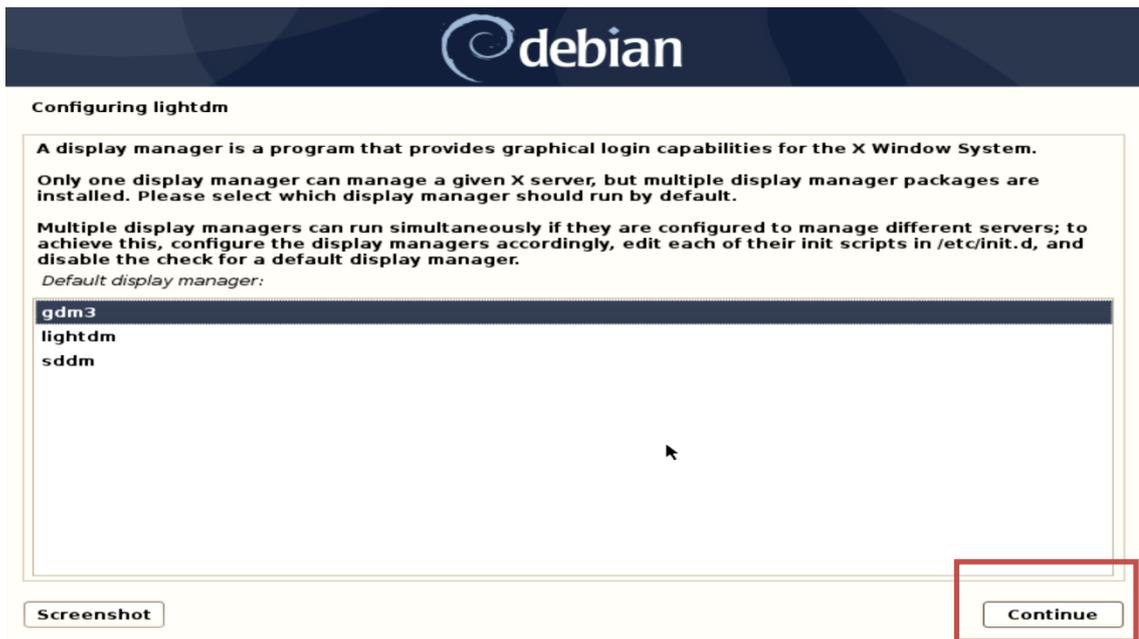
- Remove the installation media and reboot the system by pressing Continue.

- Enter user credentials created during the installation to login into the system.
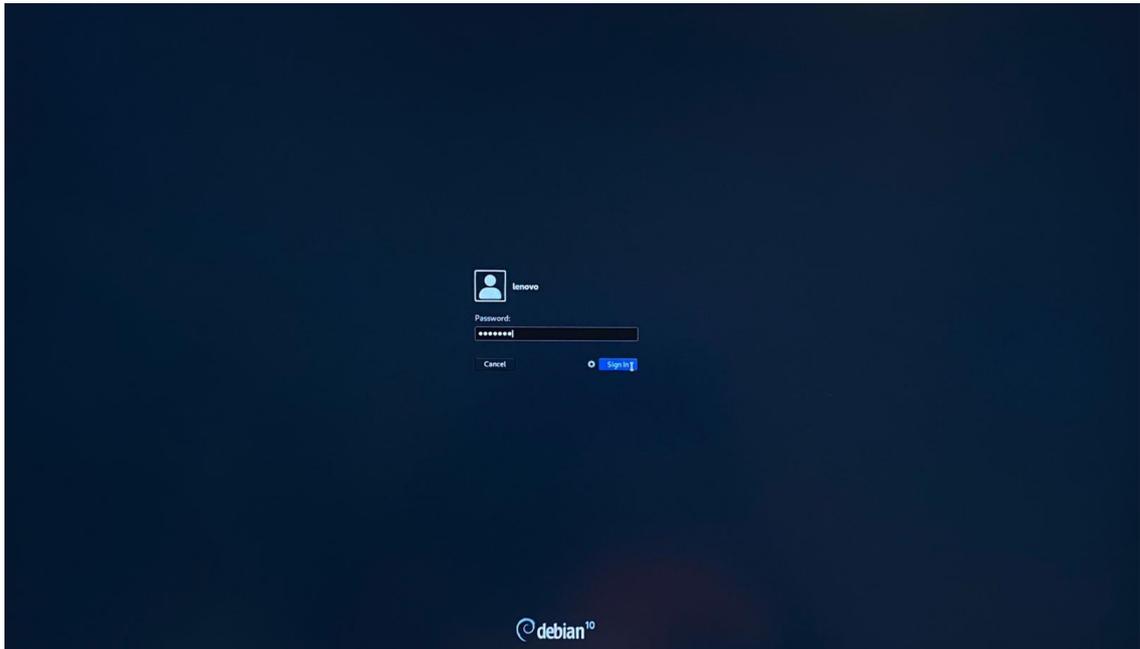
- Welcome to the Debian 10.03 login screen. Select "Yes" to save history.

Section 3 – RAID Array Installation

Please refer to the following instructions and screenshots on how to install Debian 10.03 using RAID arrays on ThinkStation P620.

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

- 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 Debian 10.03 installation media either through USB or CD/DVD.

- Power on the system and press the function F12 key when the Lenovo splash screen appears.

- Select the Debian 10.03 bootable installation media from the Startup Device Menu.
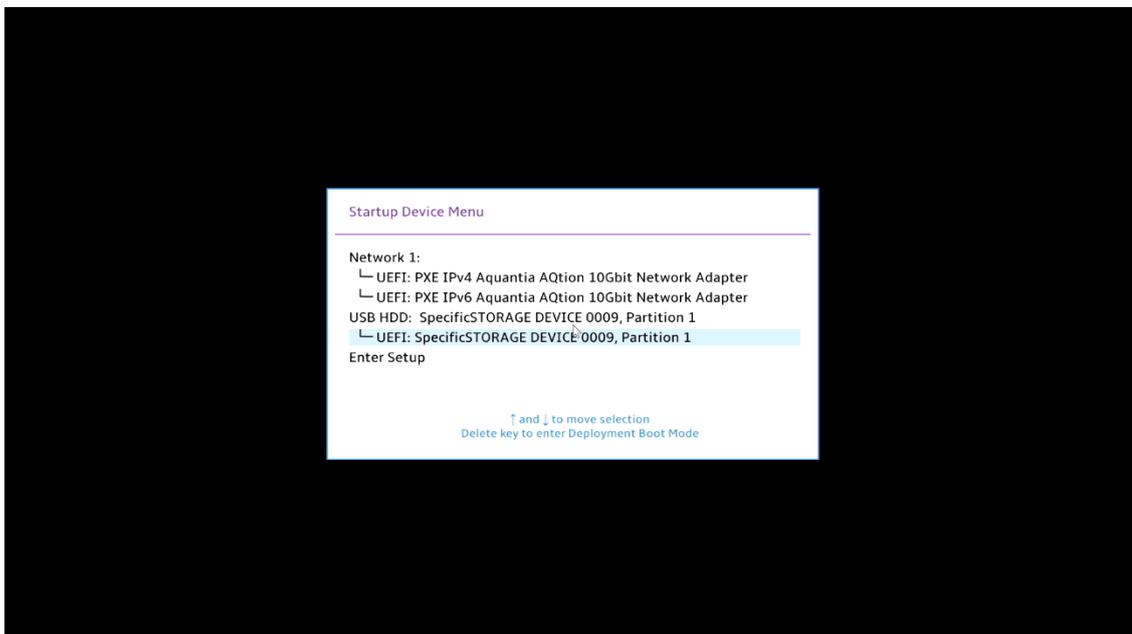
- Select the "Graphical Install" option from the GRUB boot menu, and press 'e'.
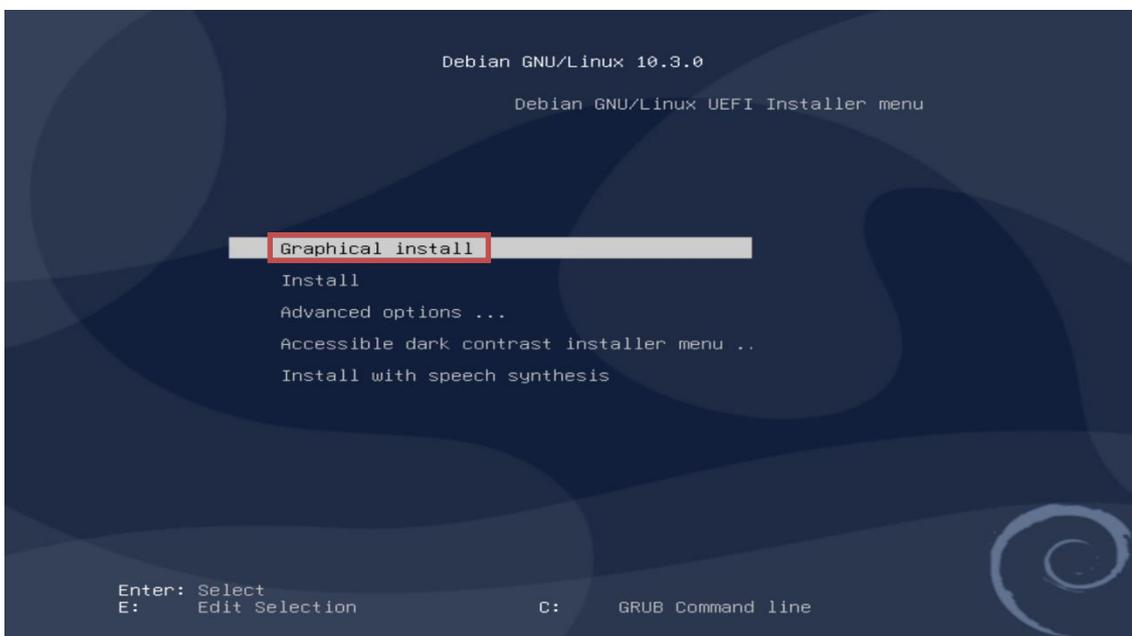
- Add the following lines to the end of the Linux kernel command parameter and press Ctrl-x.
  "*break=mount modprobe.blacklist=ahci, nvme nomodeset*"

- 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.

- Copy the contents of the driver to the root directory using the following command:
"*cp -ap /tmp/dd /*"

- Install the driver by running the following command:
"*/dd/pre_install*"

- Unmount and remove the USB flash drive by running the following command:
  "umount /tmp"

```
Please press Enter to activate this console.

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

~ # mount -t vfat /dev/sdb1 /tmp
~ # cp -ap /tmp/dd /
~ # /dd/pre_install
~ # umount /tmp
~ #
```

- Exit the "BusyBox" shell by running the following command:
  "*exit*"

```
Please press Enter to activate this console.

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

~ # mount -t vfat /dev/sdb1 /tmp
~ # cp -ap /tmp/dd /
~ # /dd/pre_install
~ # umount /tmp
~ # exit_
```

- The Debian 10.03 welcome screen should appear. Choose the appropriate language and select "Continue".
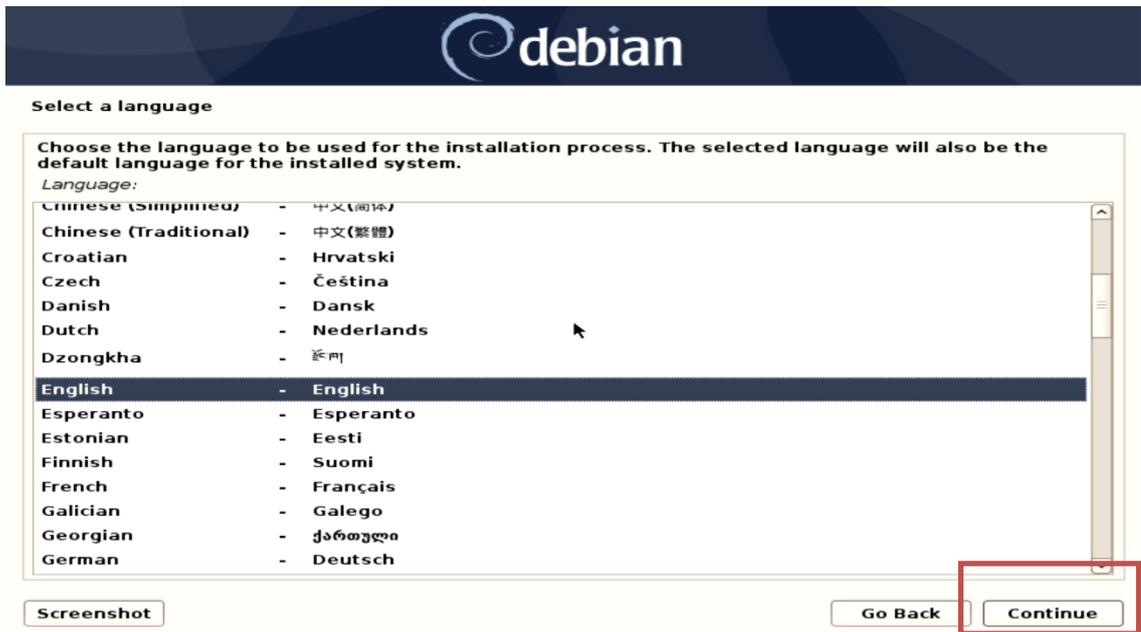
- Select your location and press "Continue".

- Configure the keyboard selecting an appropriate language and press "Continue".
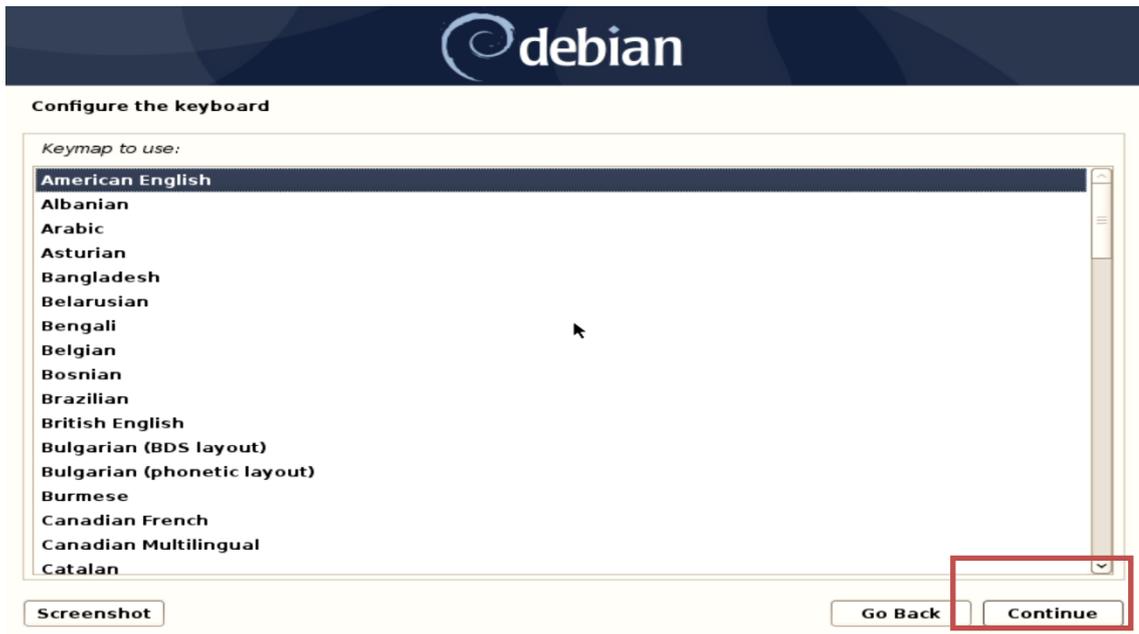
- Configure the network by entering a hostname and press "Continue".
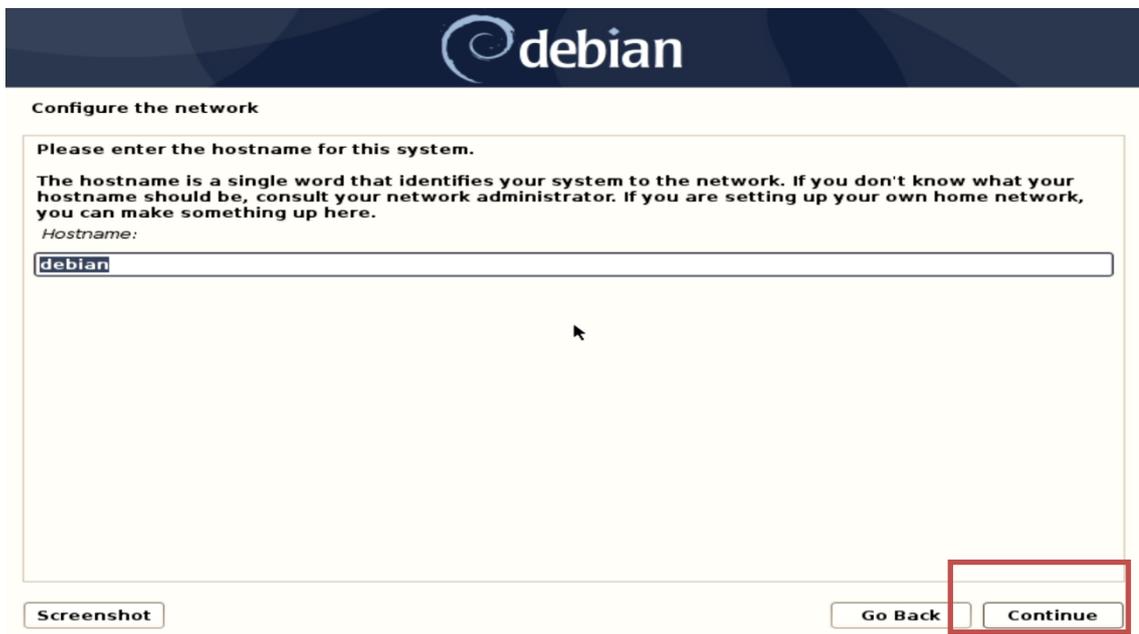
- Continue configuring the network by entering a domain name and press "Continue".

- Enter a root password and press "Continue".

- Enter a username to set up a user and press "Continue".
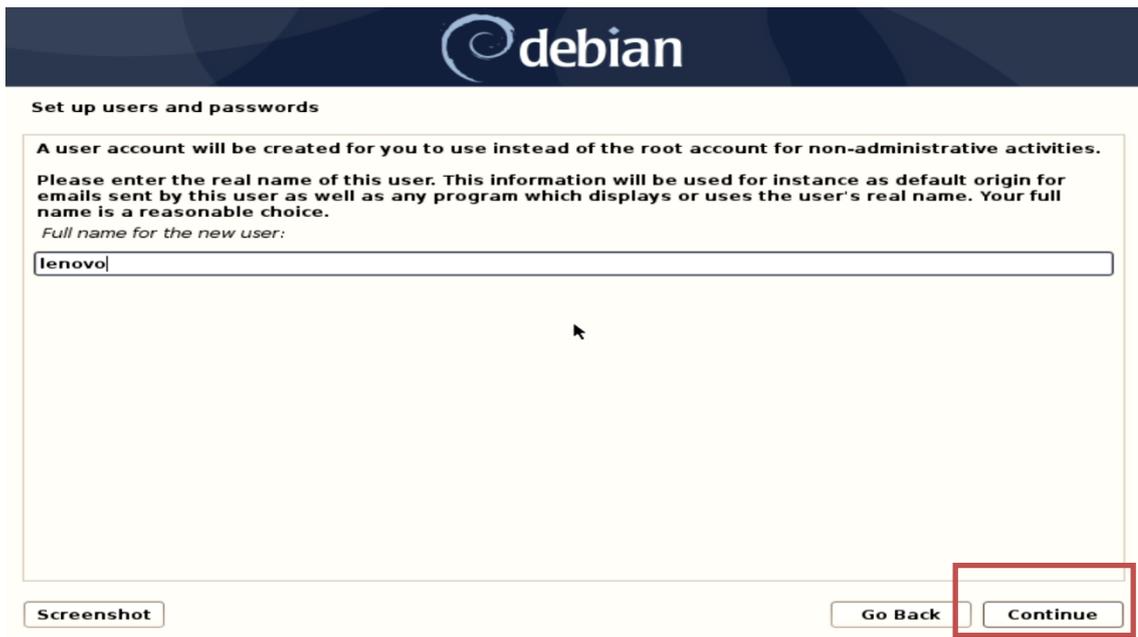
- Select a username for the new account and press "Continue".

- Enter password for the newly created username and press "Continue".
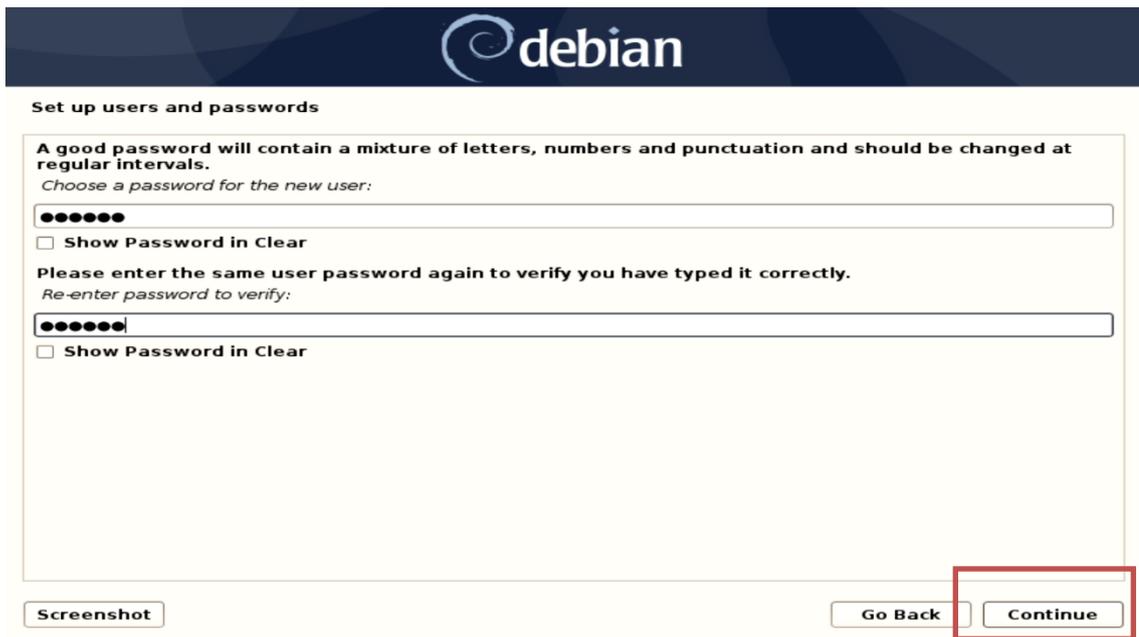
- Configure the clock by selecting an appropriate time zone and press "Continue"

- Select "Yes" for forcing UEFI installation and press "Continue".
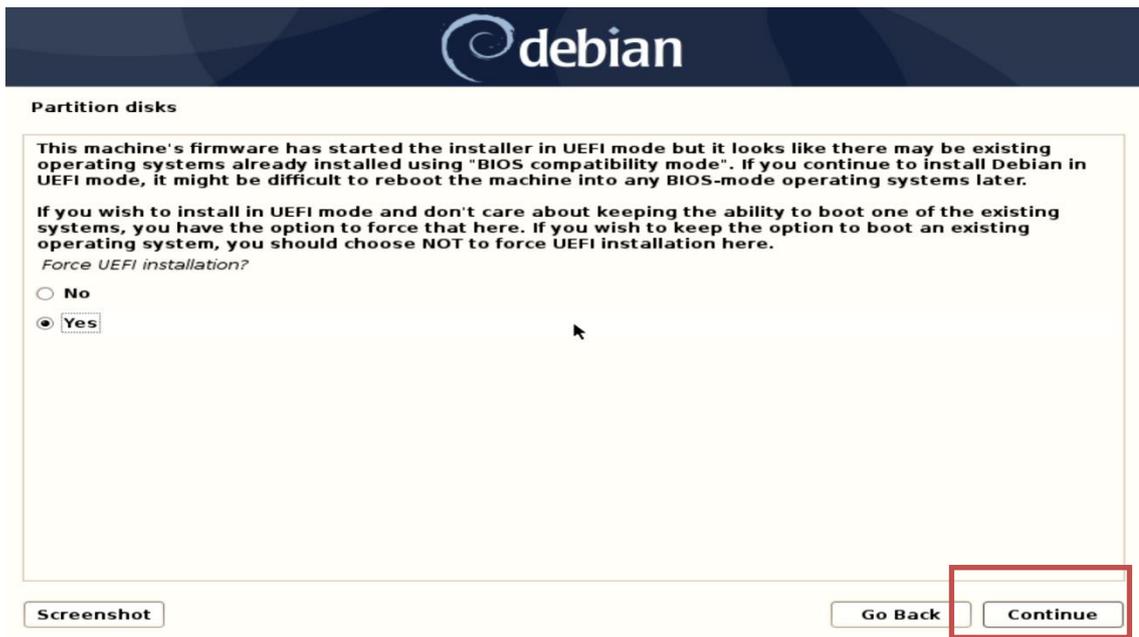
- Select a suitable partitioning method and press "Continue".
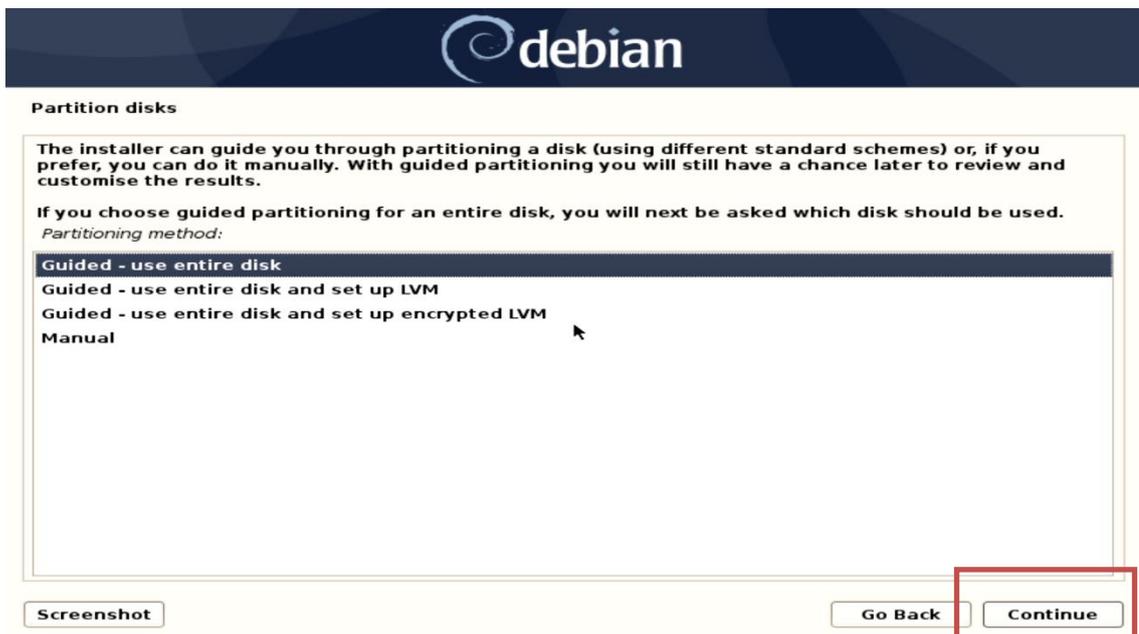
- Select the RAID array partition and press "Continue".

- Select a suitable partitioning scheme and press "Continue".
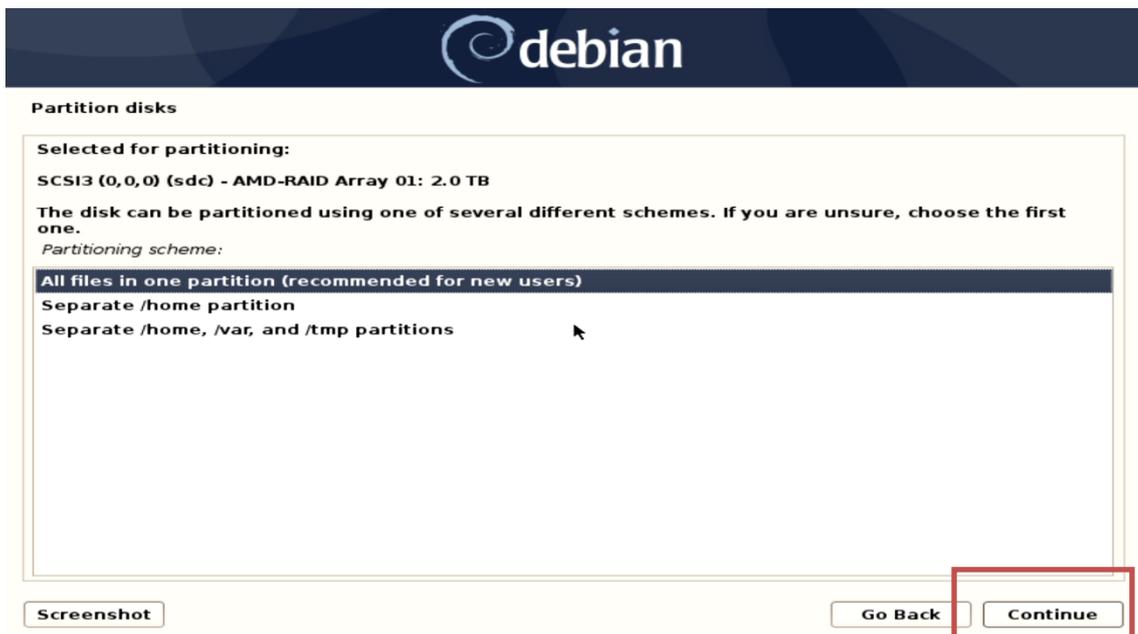
- Select "Finish partitioning and write changes to disk" and press "Continue".
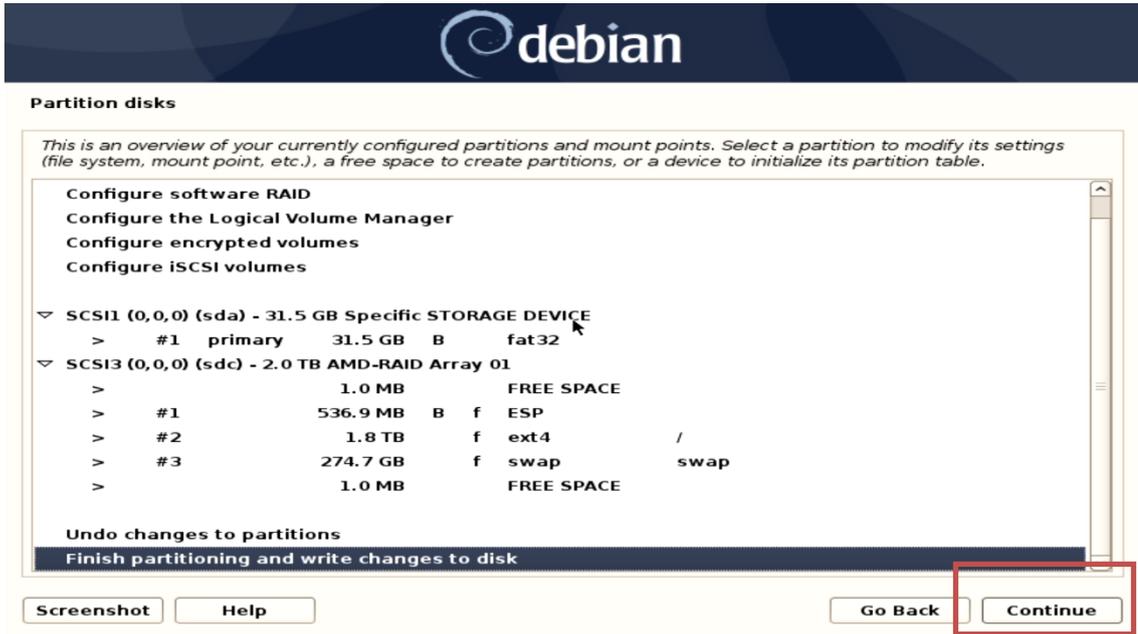
- Select "Yes" for writing the changes to disks and press "Continue".
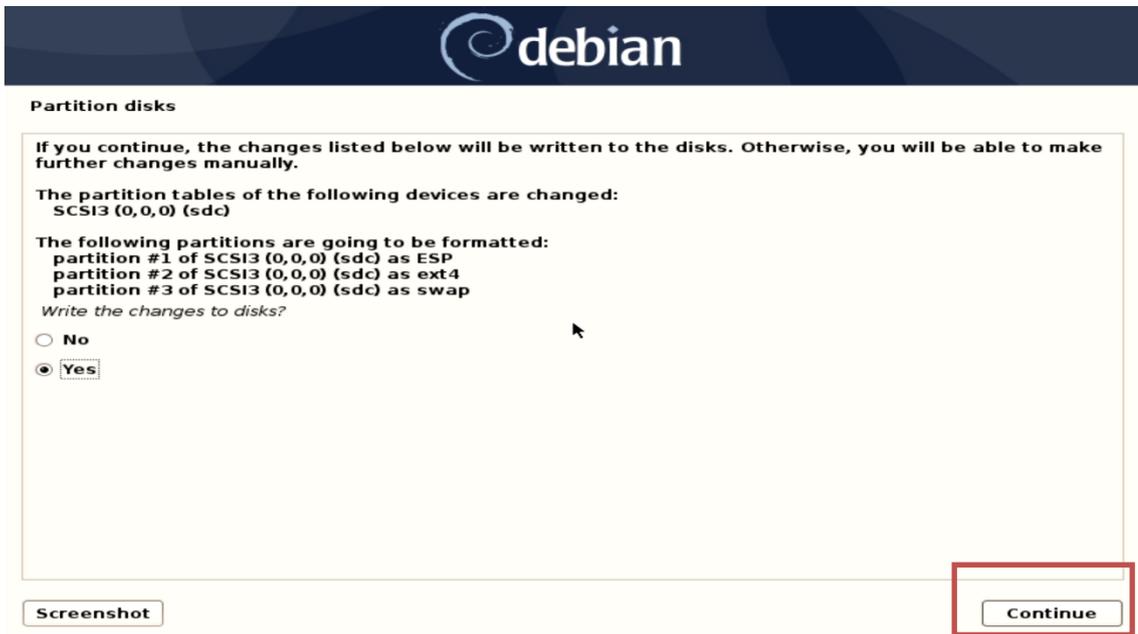
- Select "No" for network mirror and press "Continue".
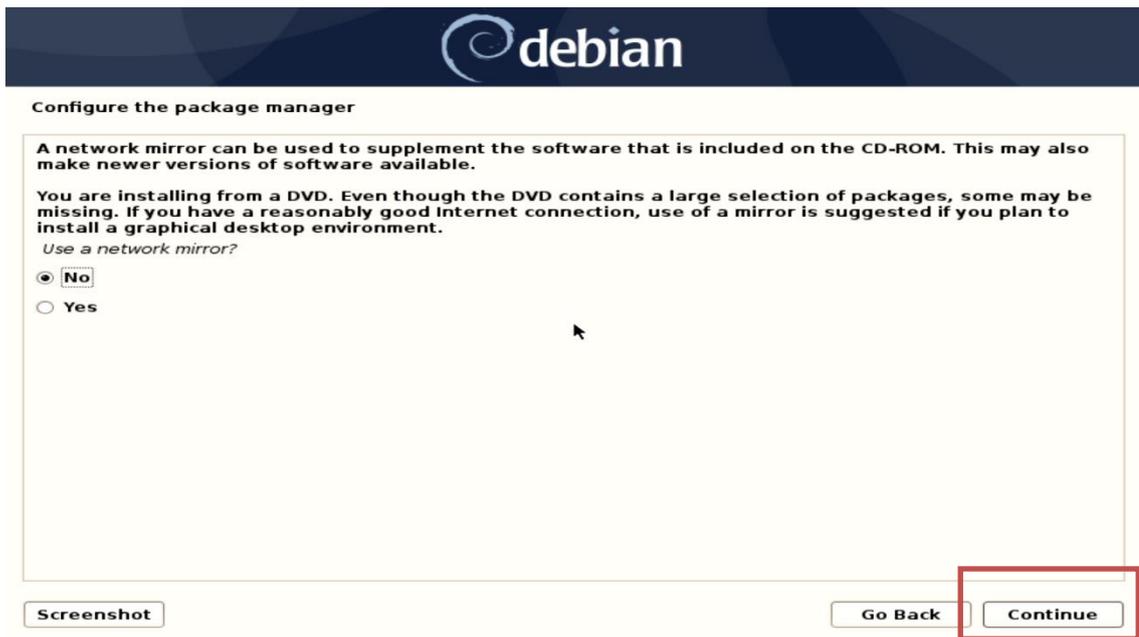
- Select "No/Yes" to participate in the package usage survey and press "Continue".
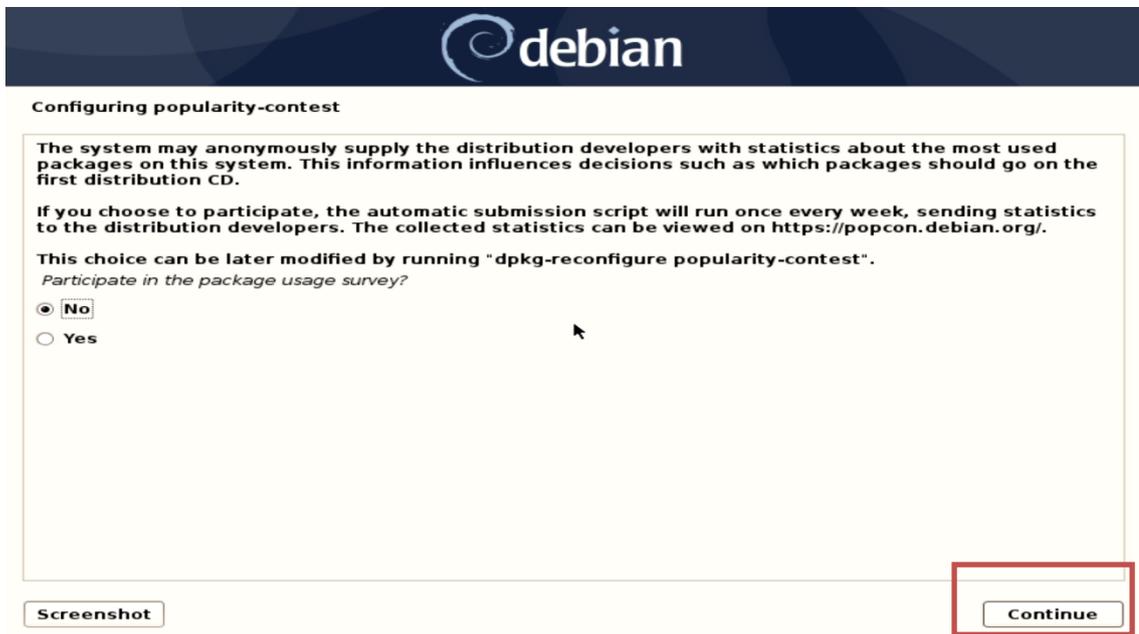
- Choose software to install and press "Continue".

- Select a display manager for Debian 10.03 and press "Continue".
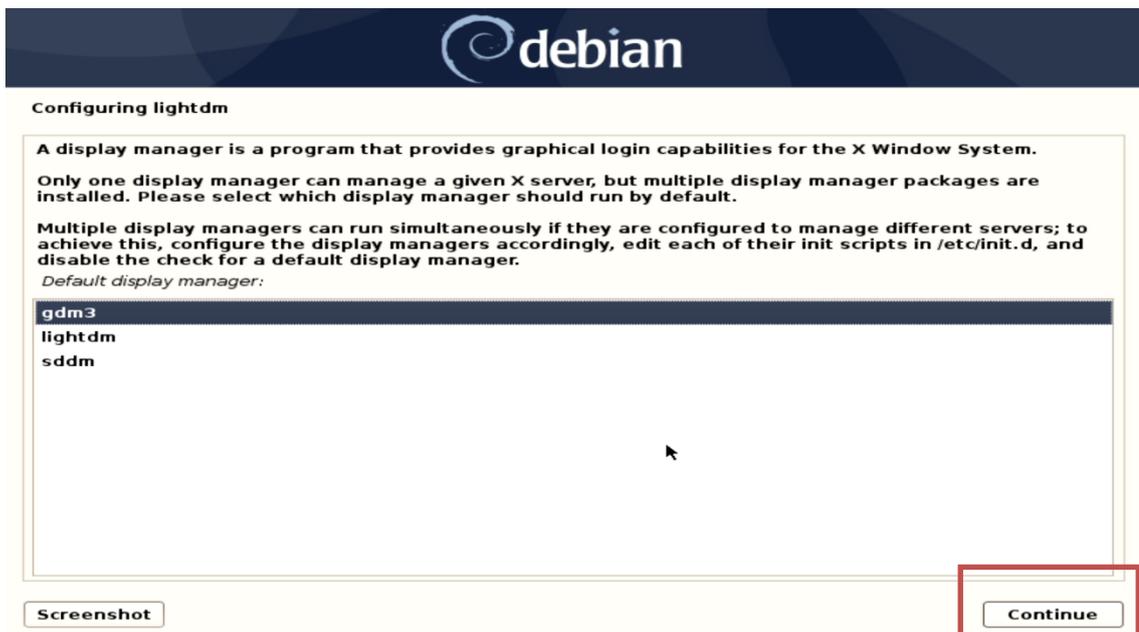
- Remove the installation media and select "Continue" to restart the system.

- Select "*Debian GNU/Linux" and press enter.

- Enter user credentials to log in and select "Sign In".
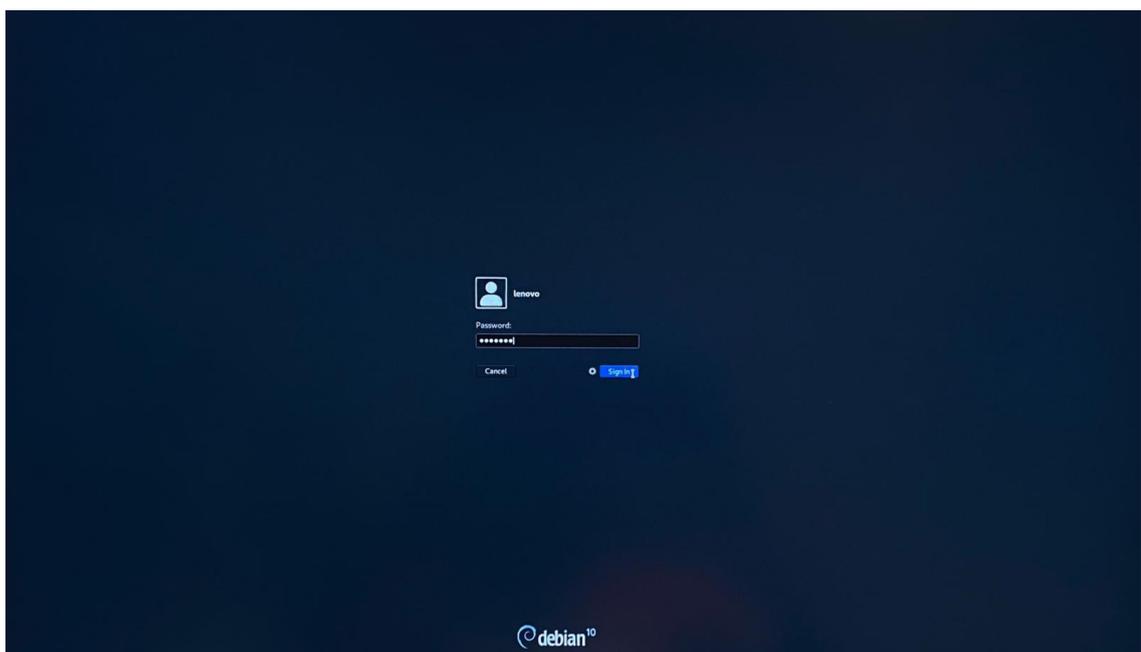
Section 4 – RAIDXpert2 Management Application

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

- Download the Linux AMD RAIDXpert2 Management Application from the Lenovo support site directly onto the Debian 10.03 desktop.

- Open a terminal window and browse to the location where the driver package is stored.

```
root@lenovo-ThinkStation-P620:/home/lenovo/Desktop/L5RAU02US14WSUSI/RAIDXpert2_R
HEL_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_R
HEL_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_R
HEL_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_R
HEL_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:/home/lenovo/Desktop/L5RAU02US14WSUSI/RAIDXpert2_R
HEL_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 &*"

- RAIDXpert2 Management Application.
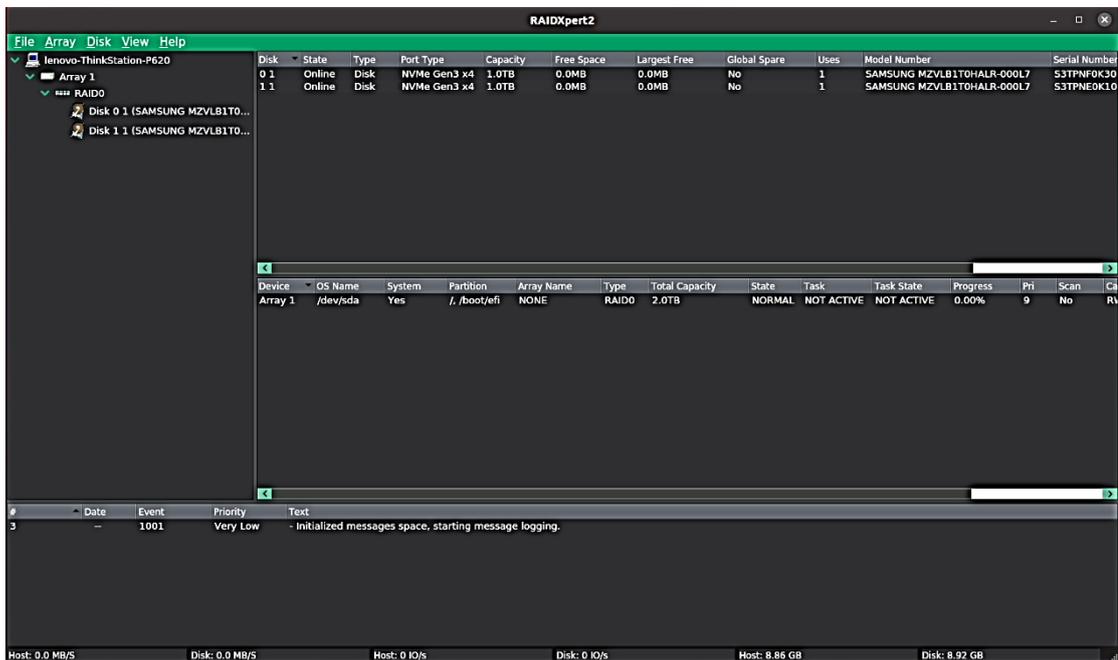
Section 5 – Installing the Aquantia LAN Driver

The onboard Aquantia LAN driver is not native to Debian 10.03 on Lenovo P620 system. In order to make your LAN working, follow the steps below.

- Mount the Debian media key to the system and comment all lines in the source.list file and add the highlighted comment using an editor of your choice and save the changes.

- Update the package list with the "apt-get update" command.
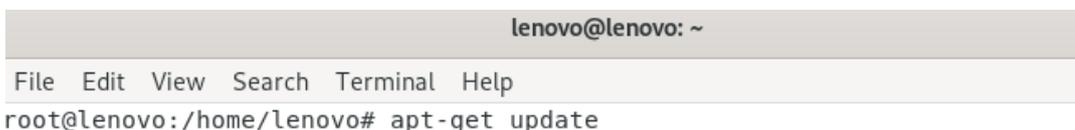
- Install the necessary packages by using the following command.
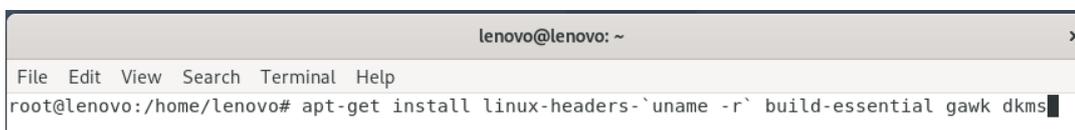
- Navigate to the directory where the Aquantia LAN driver is stored and unzip it.

```
                                lenovo@lenovo: ~

  File  Edit  View  Search  Terminal  Help

root@lenovo:/home/lenovo/Downloads# ls
L6ETN02US14WSUSI.zip
root@lenovo:/home/lenovo/Downloads# unzip L6ETN02US14WSUSI.zip
```

- Untar the "atlantic.tar.gz" file by running the following command.

```
root@lenovo:/home/lenovo/Downloads# tar zxf atlantic.tar.gz
root@lenovo:/home/lenovo/Downloads# ls
atlantic.tar.gz  L6ETN02US14WSUSI.zip  Linux  README.txt  version.txt
root@lenovo:/home/lenovo/Downloads#
```

- Compile the modules inside the "Linux" folder using "make".

```
                                lenovo@lenovo: ~

  File  Edit  View  Search  Terminal  Help

root@lenovo:/home/lenovo/Downloads# cd Linux/
root@lenovo:/home/lenovo/Downloads/Linux# ls
aq_cfg.h       aq_filters.c   aq_main.h      aq_ptp.h       aq_tsn.c       hw_atl2
aq_common.h    aq_filters.h   aq_nic.c       aq_ring.c      aq_tsn.h       Kconfig
aq_compat.c    aq_hw.h        aq_nic.h       aq_ring.h      aq_utils.h     macsec
aq_compat.h    aq_hw_utils.c  aq_pci_func.c  aq_rss.h       aq_vec.c       Makefile
aq_drvinfo.c   aq_hw_utils.h  aq_pci_func.h  aq_sysfs.c     aq_vec.h       README.txt
aq_drvinfo.h   aq_macsec.c    aq_phy.c       aq_sysfs.h     build-deb.sh   release_notes.txt
aq_ethtool.c   aq_macsec.h    aq_phy.h       aq_trace.c     dkms.sh        rpm-src.spec
aq_ethtool.h   aq_main.c      aq_ptp.c       aq_trace.h     hw_atl         ver.h
root@lenovo:/home/lenovo/Downloads/Linux# make
```

- Build and install the driver using dkms.sh script. In case of an error, run the command "export PATH=$PATH:/usr/sbin" and try running the script again.

```
                                lenovo@lenovo: ~

  File  Edit  View  Search  Terminal  Help

root@lenovo:/home/lenovo/Downloads/Linux# export PATH=$PATH:/usr/sbin


root@lenovo:/home/lenovo/Downloads/Linux# ./dkms.sh install
```

- Load the dependencies and the module using the following list of commands-
  modprobe ptp
  modprobe crc_itu_t
  insmod atlantic.ko

```
                        lenovo@lenovo: ~

 File  Edit  View  Search  Terminal  Help
root@lenovo:/home/lenovo/Downloads/Linux# modprobe ptp
root@lenovo:/home/lenovo/Downloads/Linux# modprobe crc_itu_t
root@lenovo:/home/lenovo/Downloads/Linux# insmod atlantic.ko
insmod: ERROR: could not insert module atlantic.ko: File exists
root@lenovo:/home/lenovo/Downloads/Linux#
```

- Unload and install the driver in the system using "rmmod atlantic" and "make && make install" commands. Type "y" for yes for attempting initramfs update.

```
                        lenovo@lenovo: ~

 File  Edit  View  Search  Terminal  Help
root@lenovo:/home/lenovo/Downloads/Linux# rmmod atlantic
root@lenovo:/home/lenovo/Downloads/Linux# make && make install
make -j4 -C /lib/modules/4.19.0-9-amd64/build M="/home/lenovo/Downloads/Linux" modules
make[1]: Entering directory '/usr/src/linux-headers-4.19.0-9-amd64'
  Building modules, stage 2.
  MODPOST 1 modules
make[1]: Leaving directory '/usr/src/linux-headers-4.19.0-9-amd64'
make[1]: Entering directory '/home/lenovo/Downloads/Linux'
atlantic.ko is in initramfs.
CAUTION! Updating initramfs is potentially dangerous.
Attempt initramfs update? [yN] y
```

- Verify if the LAN driver is present in /lib/modules/`uname -r` atlantic.ko

```
                        lenovo@lenovo: ~                                      x

 File  Edit  View  Search  Terminal  Help
root@lenovo:/home/lenovo/Downloads/Linux# find /lib/modules/4.19.0-9-amd64/ -name atlantic.ko
/lib/modules/4.19.0-9-amd64/kernel/drivers/net/ethernet/aquantia/atlantic/atlantic.ko
/lib/modules/4.19.0-9-amd64/updates/dkms/atlantic.ko
/lib/modules/4.19.0-9-amd64/updates/drivers/net/ethernet/aquantia/atlantic/atlantic.ko
root@lenovo:/home/lenovo/Downloads/Linux#
```

- Reboot the system or run the command "modprobe atlantic" and verify if the LAN is working.
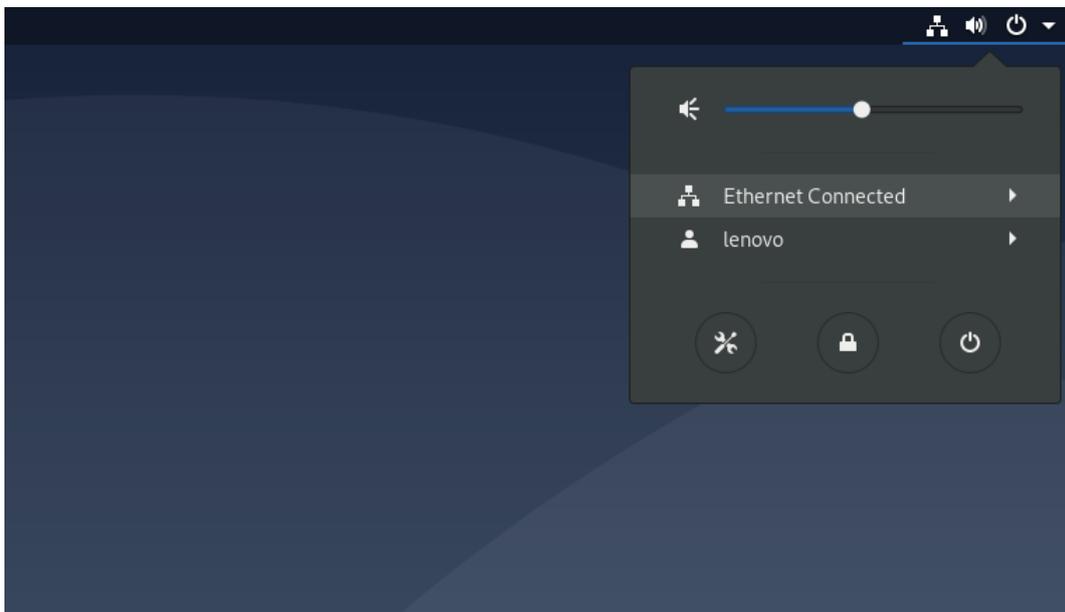
- Run the command "ip addr" to check the IP from the terminal window.

Section 6 – Installing the Nvidia Graphics Driver

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

- Download the latest Nvidia graphics driver for the appropriate Nvidia GPU from [here](#).

- In order to get the Nvidia driver running, we will need to blacklist the nouveau driver. Follow the steps below-
    - Log in as root: sudo su
    - Create blacklist.conf file under the modprobe.d directory: gedit /etc/modprobe.d/blacklist.conf
    - Blacklist nouveau driver by writing: blacklist nouveau

- Run the command update-initramfs -u

- Reboot the system.

- Open a terminal window and run the command init 3.

- Once into init 3, login using the user credentials.

```
Debian GNU/Linux 10 lenovo tty2

lenovo login: lenovo
Password:
Linux lenovo 4.19.0-9-amd64 #1 SMP Debian 4.19.118-2+deb10u1 (2020-06-07) 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@lenovo:~$ su
Password:
```

- Install build-essential and linux-headers* packages.

```
root@lenovo:/home/lenovo/Documents# apt-get install 'build-essential'
Reading package lists... Done
Building dependency tree
Reading state information... Done
build-essential is already the newest version (12.6).
build-essential set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
root@lenovo:/home/lenovo/Documents# apt-get install linux-headers*_
```

- Browse into the directory where the Nvidia driver is stored and make the Nvidia installer an executable by the command- chmod +x NVIDIA-Linux-x86-64-*

  Once done, run the Nvidia driver by- ./NVIDIA-Linux-x86_64-430.50.run

```
root@lenovo:/home/lenovo# cd Documents/
root@lenovo:/home/lenovo/Documents# ls
NVIDIA-Linux-x86_64-440.100.run
root@lenovo:/home/lenovo/Documents# chmod +x NVIDIA-Linux-x86_64-440.100.run
root@lenovo:/home/lenovo/Documents# ls
NVIDIA-Linux-x86_64-440.100.run
root@lenovo:/home/lenovo/Documents# ./NVIDIA-Linux-x86_64-440.100.run _
```

- Wait until the kernel modules are completely built.
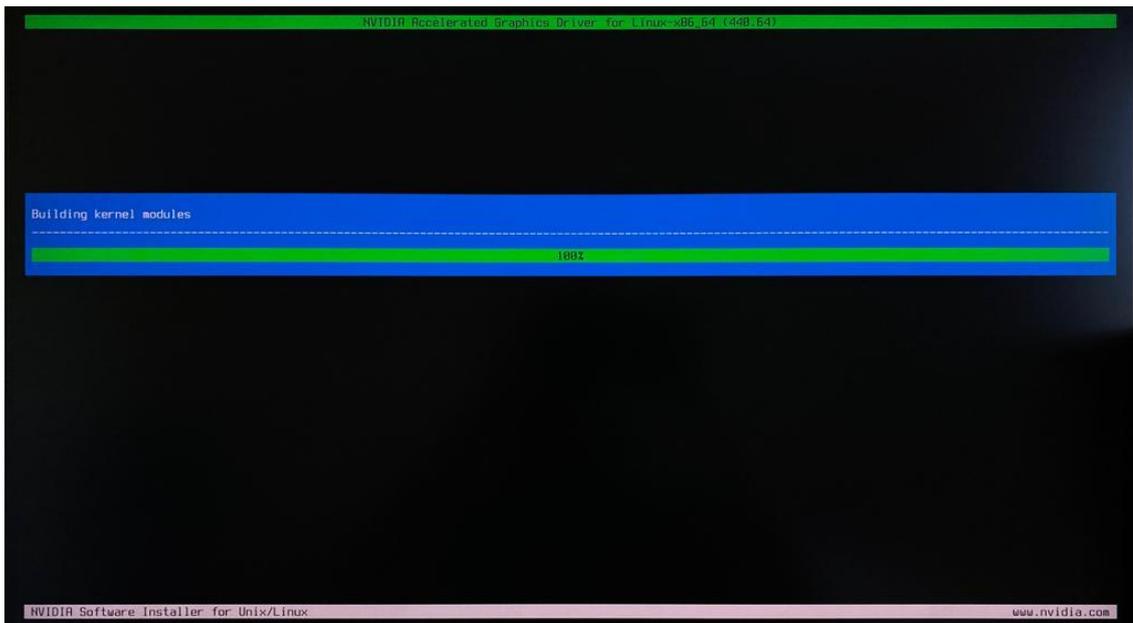
- Select Yes for installing 32-bit compatibility libraries.

- Select Install and overwrite existing files.
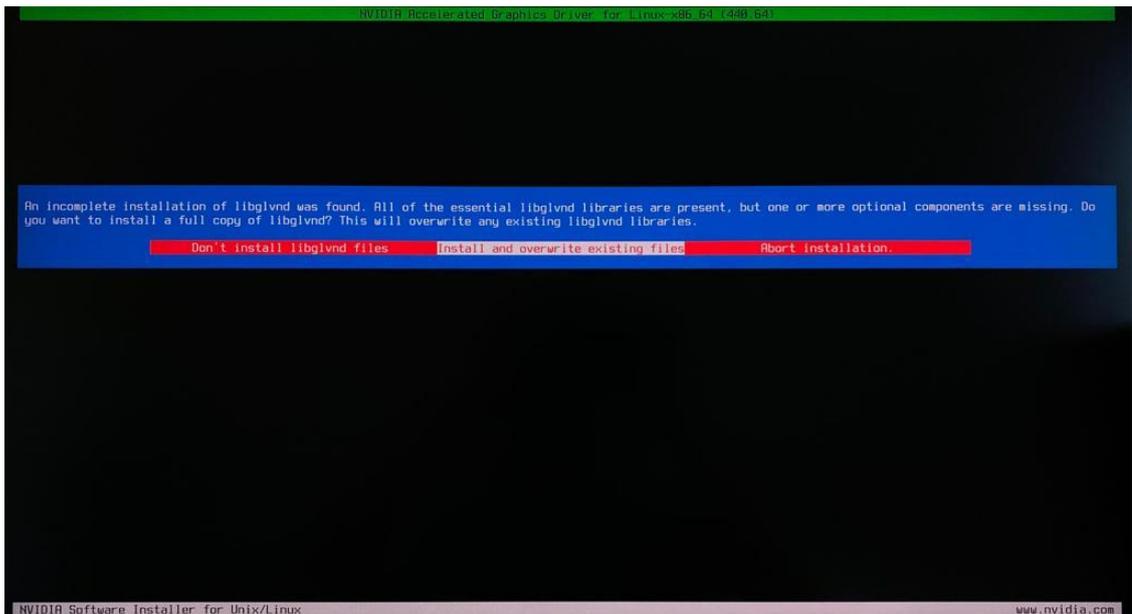
- Select Yes to run nvidia-xconfig utility to automatically update your X configuration file.
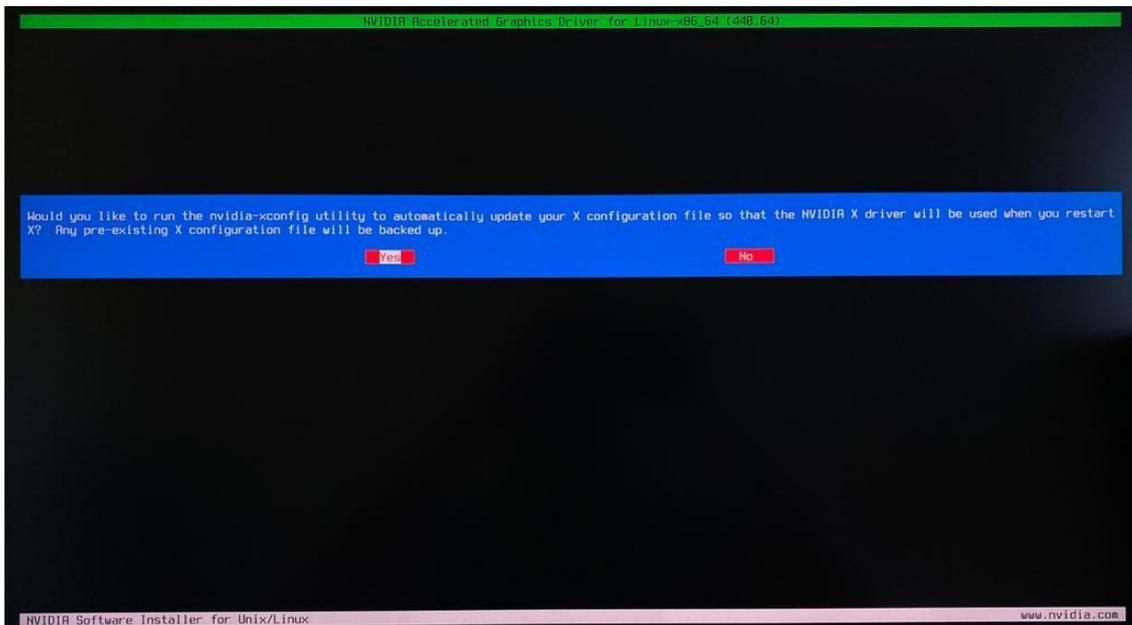
- Select OK once the X configuration file gets updated successfully.
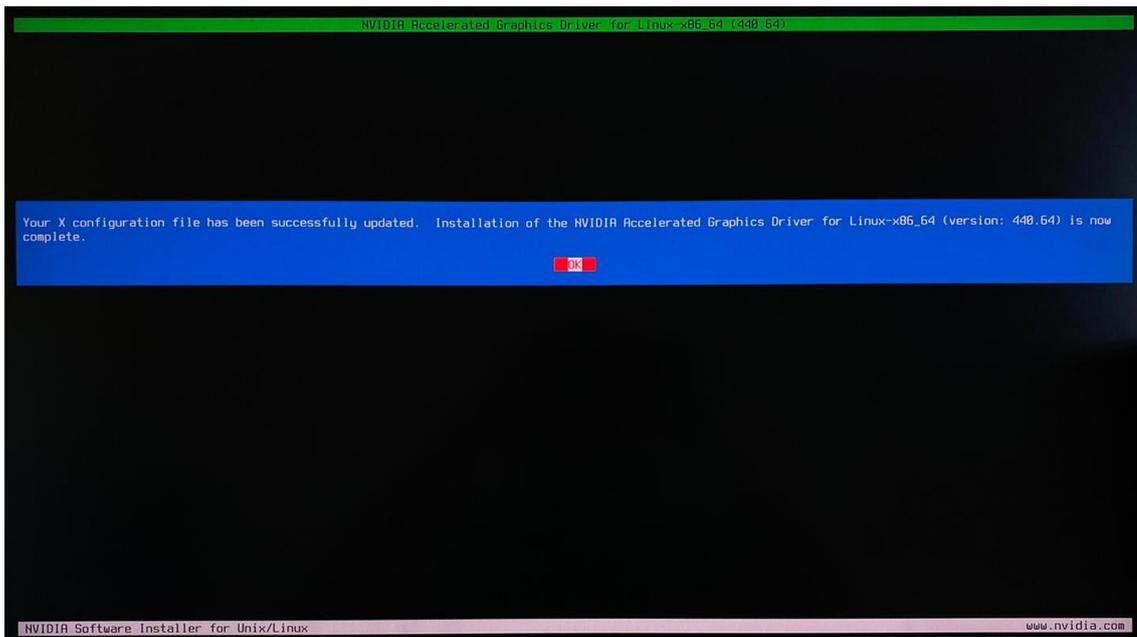
- Execute the following command to verify the Nvidia driver is loaded-
nvidia-smi

- Reboot the system.

Section 7 – Revision History

Version	Date	Author	Changes/Updates
1.0	06/09/2020	Sayali Pawar	Initial launch release