

Debian Linux Setup Guide

For ThinkStation P520c, P520, P720, & P920



Section 1 - BIOS Setup and Preinstallation Steps

The first step before installing Linux is to make sure BIOS is setup correctly. By default, the system BIOS should be set up to handle both UEFI/GPT and Legacy/MBR partitions.

- **For NVMe PCIe SSDs**, make sure these drives are set up in PCIE mode (not VMD mode).
 - Boot into BIOS by pressing the function F1 key at the “Lenovo” splash screen.
 - Select the “Advanced” menu option (left) and “Intel VMD technology” (right).



Setup

- Main
- Devices
- Advanced**
- Power
- Security
- Startup
- Exit

Serial Port Console Redirection
Serial Port Console Redirection

PCIE/PCI Settings

WHEA Configuration
Enables or disables Windows Hardware Error Architecture.

CPU Configuration

Memory RAS Configuration
Contains Memory features.

Common RefCode Configuration
Displays and provides option to change the Common RefCode Settings.

Intel TXT (LT-SX) Configuration
Intel TXT (LT-SX) Configuration

AMT Configuration
AMT Configuration

Intel® VMD technology
Enable the VMD (Volume Management Device) technology to support configure PCIe storages to VROC (Virtual RAID on CPU) feature.
Note: Only on same PCIe x16 ports are supported to be configured as one VROC (Virtual RAID on CPU) in Intel(R) RSTe RAID Controller menu.
VMD: configure this slot as VMD (Intel Volume Management Device).
PCIe: configure this slot as general PCI Express port.

Intel(R) Virtual RAID on CPU

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Previous Values(F2)
Optimized Defaults(F8)
Back (ESC)
Save & Exit (F10)

Lenovo
UEFI Setup Utility

- Disable each “CPU x Port y”.

The screenshot displays the UEFI Setup Utility interface. On the left is a navigation menu with options: Main, Devices, **Advanced** (highlighted in red), Power, Security, Startup, and Exit. The main area shows instructions for enabling VMD technology and configuring PCIe ports. Below the instructions, a list of ports is shown, each with a dropdown menu set to "Disabled":

- CPU 0 Port 1. Disabled
- CPU 0 Port 3. Disabled
- CPU 1 Port 1. Disabled
- CPU 1 Port 2. Disabled
- CPU 1 Port 3. Disabled

On the right side of the screen, there is a vertical toolbar with icons for: Previous Values(F2), Optimized Defaults(F9), Back (ESC), and Save & Exit (F10). The Lenovo logo is visible in the bottom left and a vertical red bar with the Lenovo logo is on the far right. The version information at the bottom reads: "Version 1.01.0040. Copyright (C) 2017 American Megatrends, Inc."

- Select F10 to “Save and Exit” BIOS.

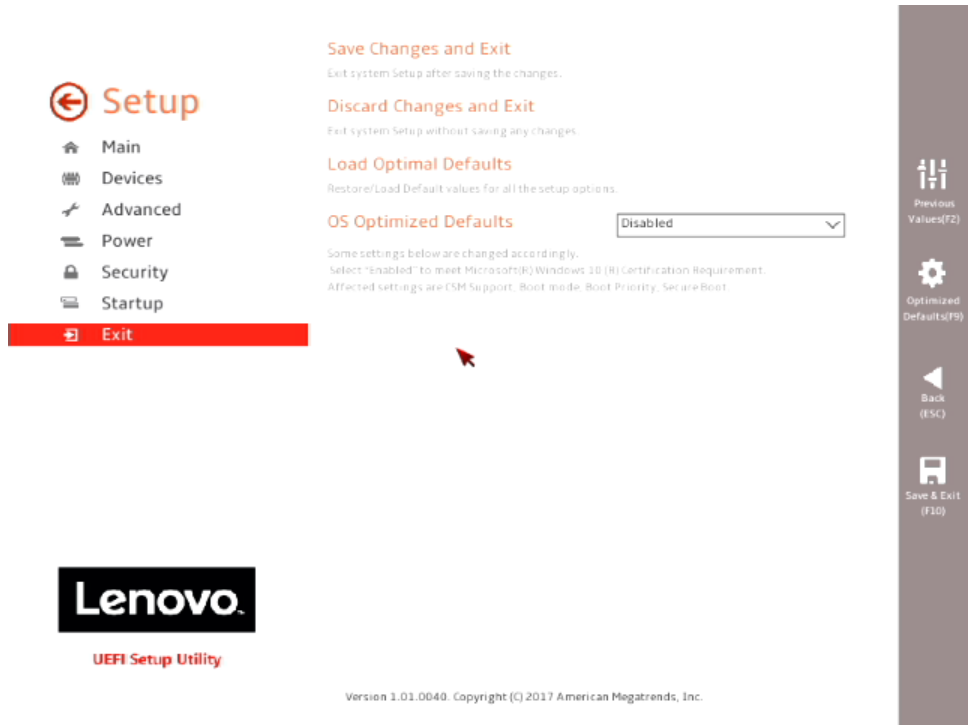
- **For UEFI/GPT installations (recommended):**
 - Boot into BIOS by pressing the function F1 key at the “Lenovo” splash screen.
 - Select “Setup” from the screen indicated below.

Lenovo™

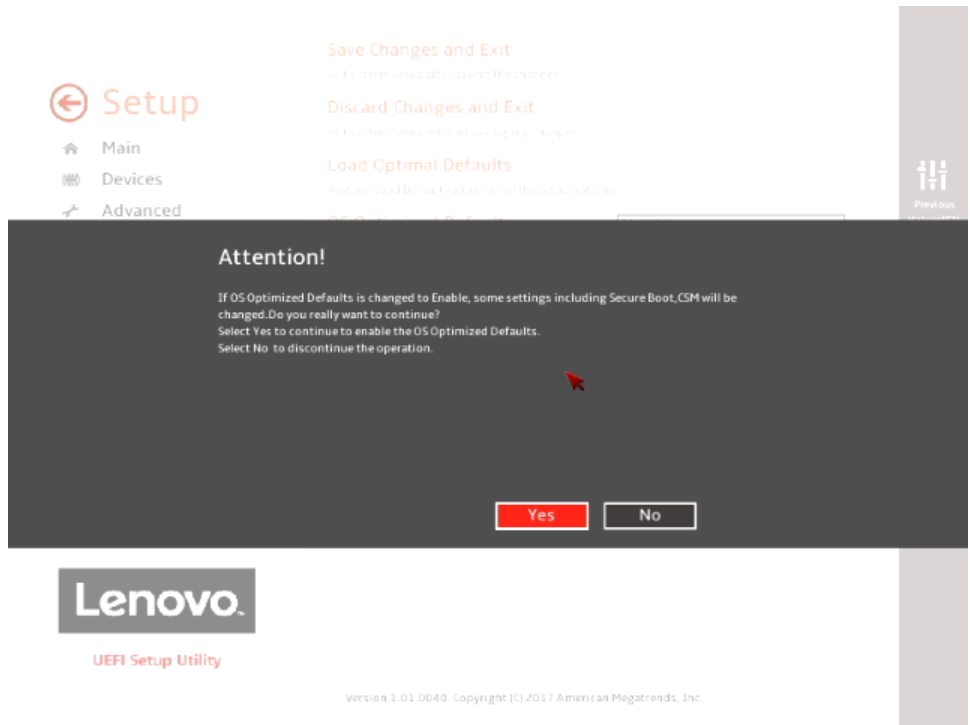
ThinkStation®



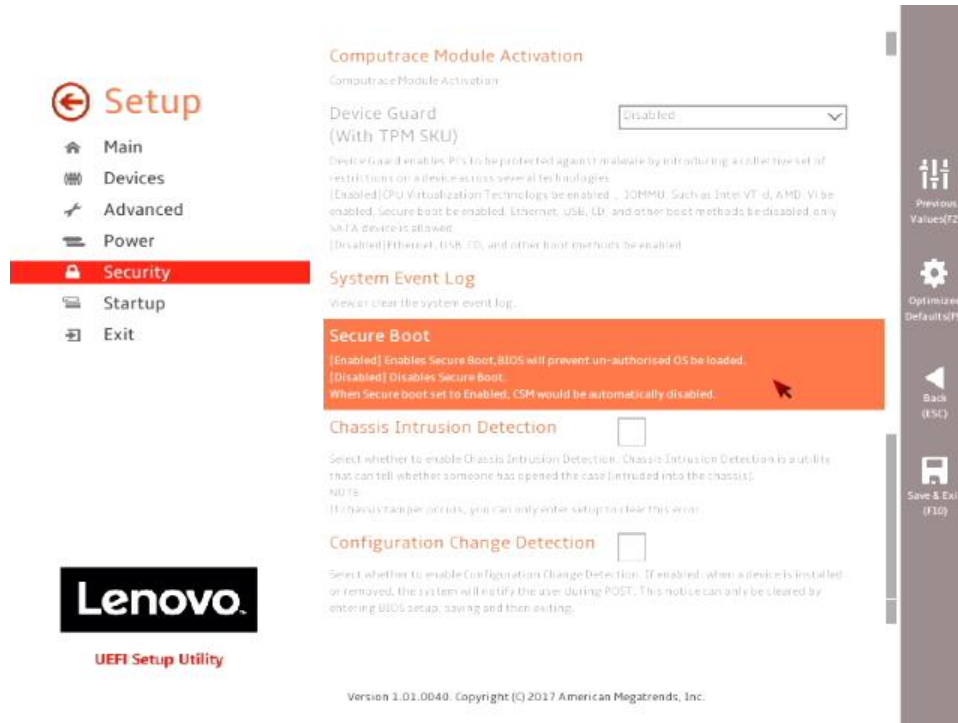
- Select “Exit” menu option (left) and set “OS Optimized Defaults” (right) to “Enabled”.



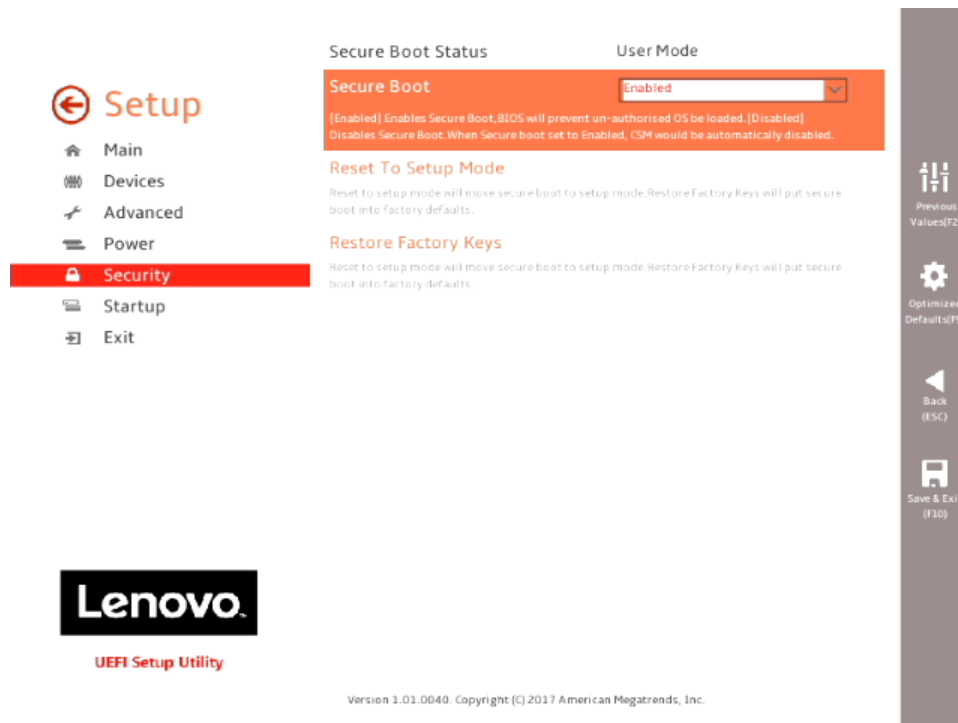
- Select “Yes” at the confirmation screen indicated below.



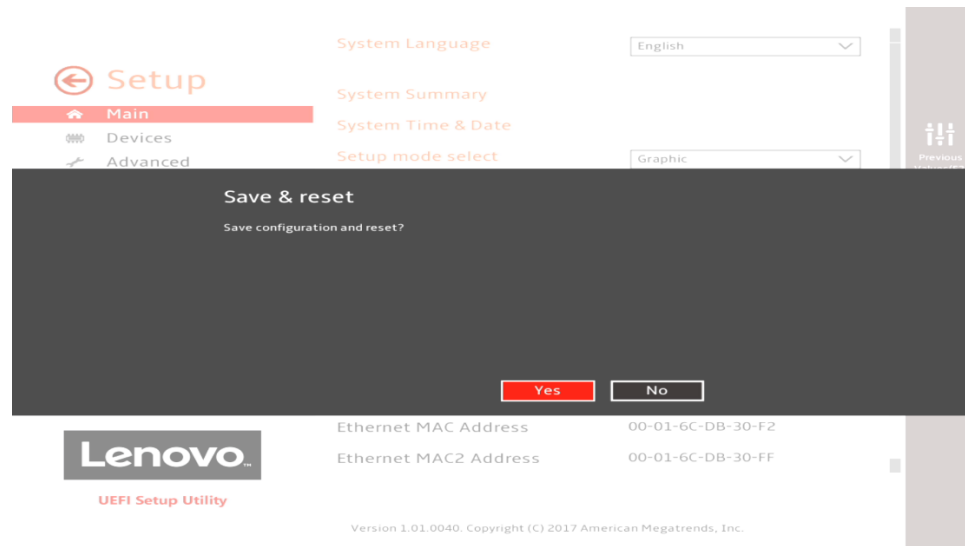
- Select the “Security” menu option (left), then select “Secure Boot” option (right).



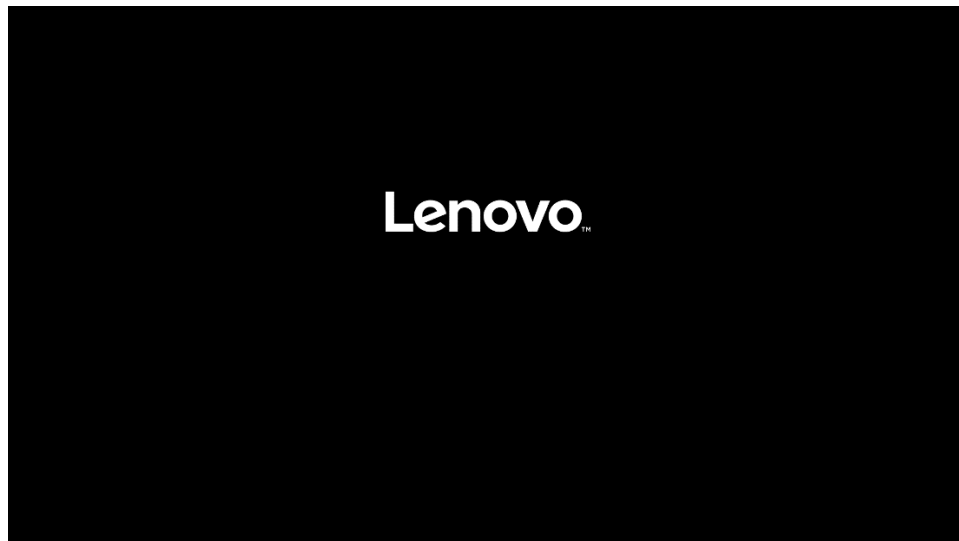
- Disable “Secure Boot”.



- Select F10 to “Save and Exit” BIOS.



- Insert the Debian install 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 “UEFI” option from the F12 boot menu list.



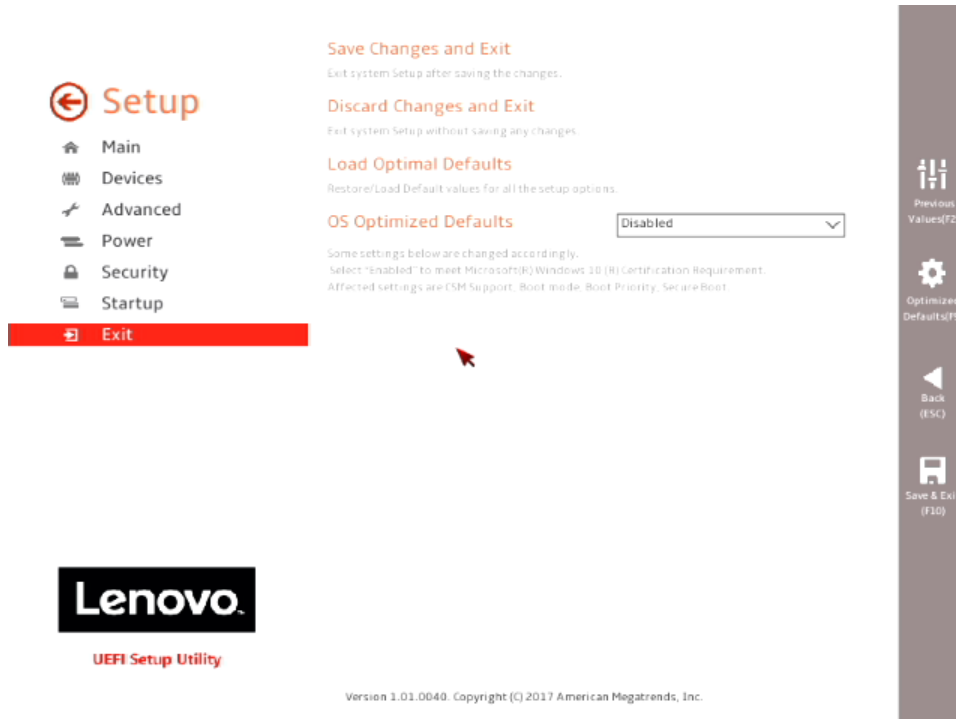
- **For Legacy/MBR installations (not recommended):**

- Boot into BIOS by pressing the function F1 key at the “Lenovo” splash screen.
- Select “Setup” from the screen indicated below.



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- Select “Exit” menu option (left) and set “OS Optimized Defaults” (right) to “Disabled”.



- Select “Startup” menu option (left) and “CSM Configuration” (right).

Setup

- Main
- Devices
- Advanced
- Power
- Security
- Startup**
- Exit

Primary Boot Sequence
This sequence is used when the system is powered up normally.
Use Up and Down arrows to select a device.
← and → move the device up or down.
⇧ includes / includes the device to boot.

Automatic Boot Sequence
This sequence is used when a communication device wakes the system up.
Use Up and Down arrows to select a device.
← and → move the device up or down.
⇧ includes / includes the device to boot.

Error Boot Sequence
This sequence is used when BIOS determines that an error has occurred.
Use Up and Down arrows to select a device.
← and → move the device up or down.
⇧ includes / includes the device to boot.

CSM Configuration
CSM Configuration

CSM

Compatibility support Module. Permit the loading of a traditional operation system.
Enable to support Non-UEFI operation system.
Disable to support Win10 64-bit and later UEFI aware operation system.
When CSM enabled, the boot will automatically set to Disable.

Boot Mode

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Previous Values (F2)
Optimized Defaults (F9)
Back (ESC)
Save & Exit (F10)

- Select the “Storage” option ROM and set the pull-down menu to “Legacy”.

Setup

- Main
- Devices
- Advanced
- Power
- Security
- Startup**
- Exit

Option ROM execution order

Network

Controls the execution of UEFI and Legacy PXE OpROM

Storage

Controls the execution of UEFI and Legacy Storage OpROM

Video

Controls the execution of UEFI and Legacy Video OpROM

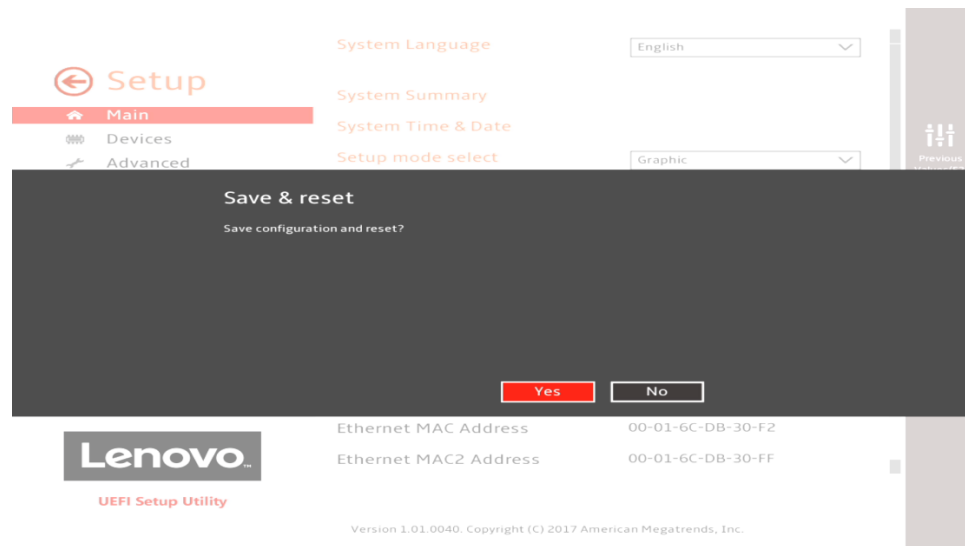
Other PCI devices

Determines OpROM execution policy for devices other than Network, Storage, or Video

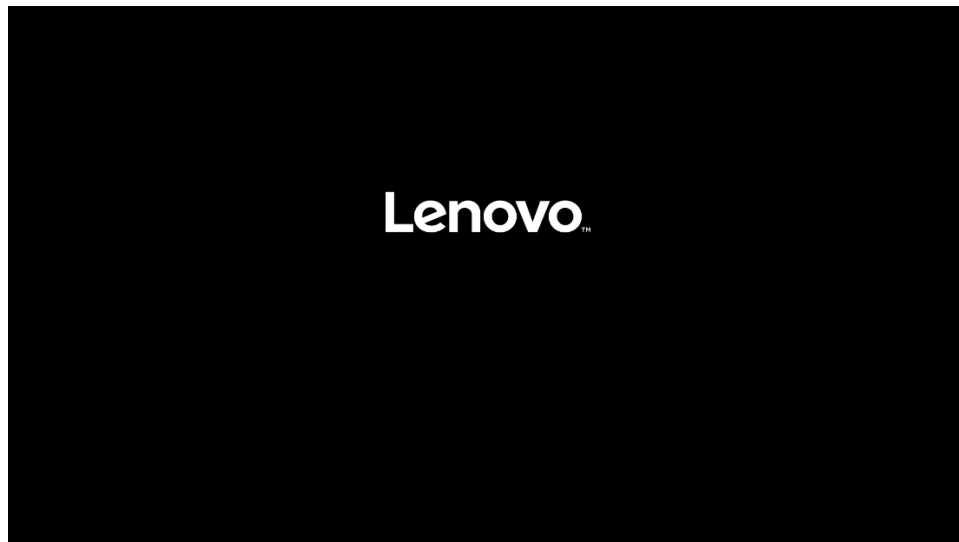
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Previous Values (F2)
Optimized Defaults (F9)
Back (ESC)
Save & Exit (F10)

- Select F10 to “Save and Exit” BIOS.



- Insert the Debian install 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 “Legacy” option from the F12 boot menu.

```
Startup Device Menu:
-----
SATA 1: SanDisk SD7SB6S256G1001
└ Legacy: SanDisk SD7SB6S256G1001
SATA 6: HL-DT-ST DVDROM DH60N
└ Legacy: HL-DT-ST DVDROM DH60N
└ UEFI: HL-DT-ST DVDROM DH60N
Network 1:
└ Legacy: IBA CL Slot 00FE v0110
└ UEFI: IPV4 Intel(R) Ethernet Connection (H) I219-LM
└ UEFI: IPV6 Intel(R) Ethernet Connection (H) I219-LM
Network 2:
└ Legacy: IBA GE Slot 0400 v1555
└ UEFI: IPV4 Intel(R) I210 Gigabit Network Connection
└ UEFI: IPV6 Intel(R) I210 Gigabit Network Connection
Enter Setup

↑ and ↓ to move selection
```



Section 2 – Installing Debian Linux 9 “Stretch”

Please refer to the following instructions and screenshots on how to install Debian on the ThinkStation P520c, P520, P720, and P920 workstations.

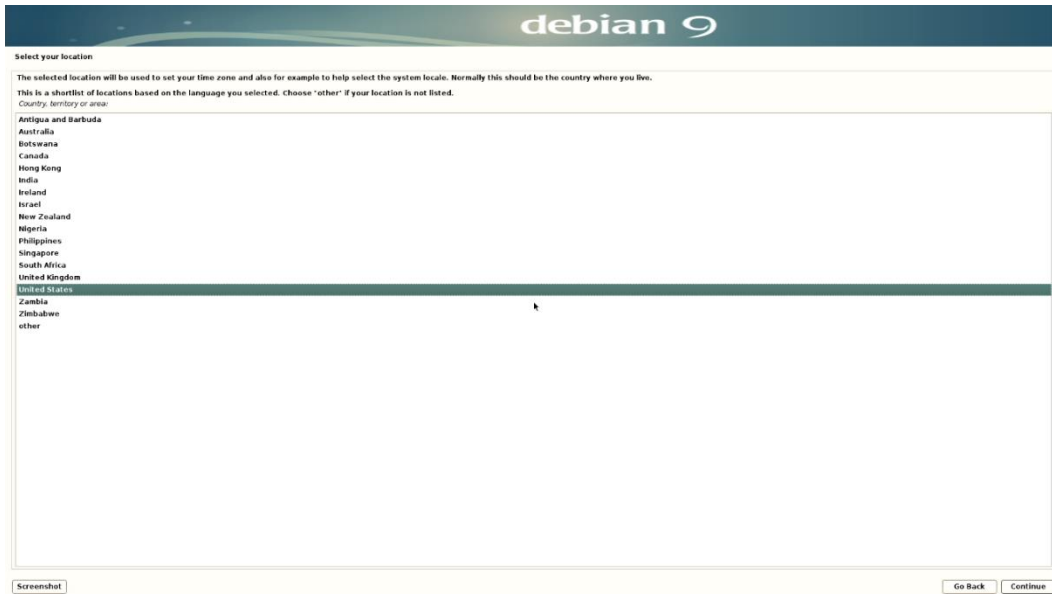
- Select “Graphical Install” from the Debian GNU/Linux UEFI Installer menu.



- Select a language.



- Select your location.



- Configure the keyboard.



- Configure the network by choosing the primary network interface.



- Configure the network by entering a hostname.



- **OPTIONAL:** Configure the network by entering a domain name.



The screenshot shows the 'Configure the network' step in the Debian 9 installer. The title bar at the top reads 'debian 9'. Below the title, the text says 'Configure the network'. A paragraph explains that the domain name is the part of the Internet address to the right of the host name, often ending in .com, .net, .edu, or .org. Below this is a text input field labeled 'Domain name:'. At the bottom of the window, there are 'Screenshot', 'Go Back', and 'Continue' buttons.

- Set up a root password.



The screenshot shows the 'Set up users and passwords' step in the Debian 9 installer. The title bar at the top reads 'debian 9'. Below the title, the text says 'Set up users and passwords'. A paragraph explains that a password must be set for 'root', the system administrative account, and that it should be strong and not easily guessed. Below this is a text input field labeled 'Root password:'. There are two checkboxes: 'Show Password in Clear' (unchecked) and 'Please enter the same root password again to verify that you have typed it correctly.' Below the second checkbox is another text input field labeled 'Re-enter password to verify:'. At the bottom of the window, there are 'Screenshot', 'Go Back', and 'Continue' buttons.

- Set up a user account and password.



debian 9

Set up users and passwords

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.

Full name for the new user:

Screenshot Go Back Continue

- Set up a username.



debian 9

Set up users and passwords

Select a username for the new account. Your first name is a reasonable choice. The username should start with a lower-case letter, which can be followed by any combination of numbers and more lower-case letters.

Username for your account:

Screenshot Go Back Continue

- Set up a password for the username created above.



The screenshot shows the 'Set up users and passwords' step in the Debian 9 installer. At the top, there is a dark blue header with the 'debian 9' logo. Below the header, the text reads 'Set up users and passwords' and 'A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.' There are two password input fields. The first field is labeled 'Choose a password for the new user:' and has a 'Show Password in Clear' checkbox. The second field is labeled 'Please enter the same user password again to verify you have typed it correctly. Re-enter password to verify:' and also has a 'Show Password in Clear' checkbox. At the bottom of the window, there are 'Screenshot', 'Go Back', and 'Continue' buttons.

- Configure the clock.



The screenshot shows the 'Configure the clock' step in the Debian 9 installer. At the top, there is a dark blue header with the 'debian 9' logo. Below the header, the text reads 'Configure the clock' and 'If the desired time zone is not listed, then please go back to the step "Choose language" and select a country that uses the desired time zone (the country where you live or are located).' There is a scrollable list of time zones: 'UTC', 'Central', 'Mountain', 'Pacific', 'Alaska', 'Hawaii', 'Arizona', 'East Indiana', and 'Samea'. At the bottom of the window, there are 'Screenshot', 'Go Back', and 'Continue' buttons.

- Partition the disk.
 - For simplicity sake, choose the following: “Guided – use entire disk”



- Select the disk to partition.

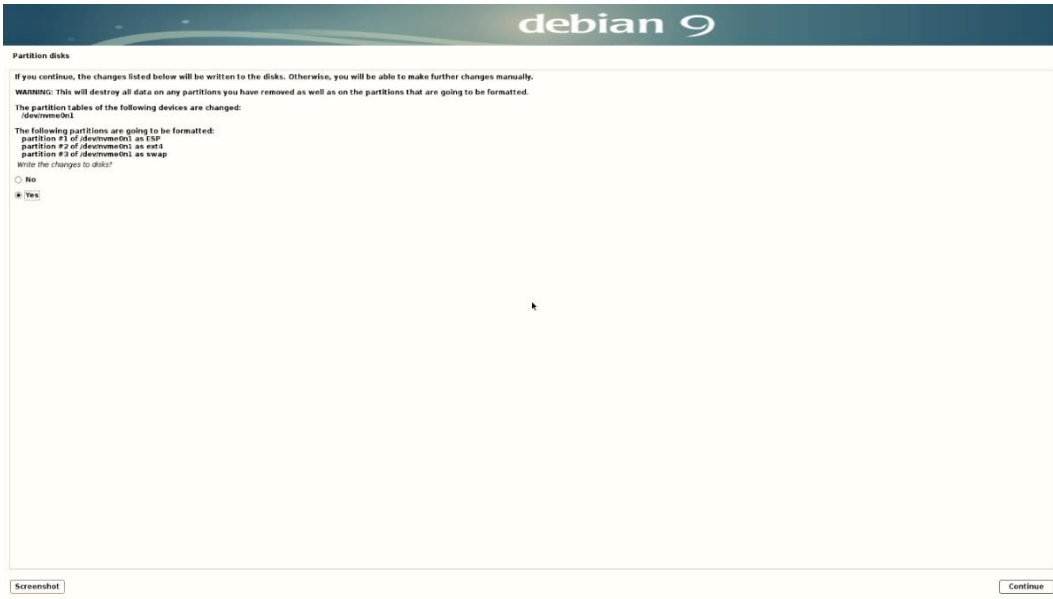


- Choose how to partition the disk.



- Confirm disk partitions.





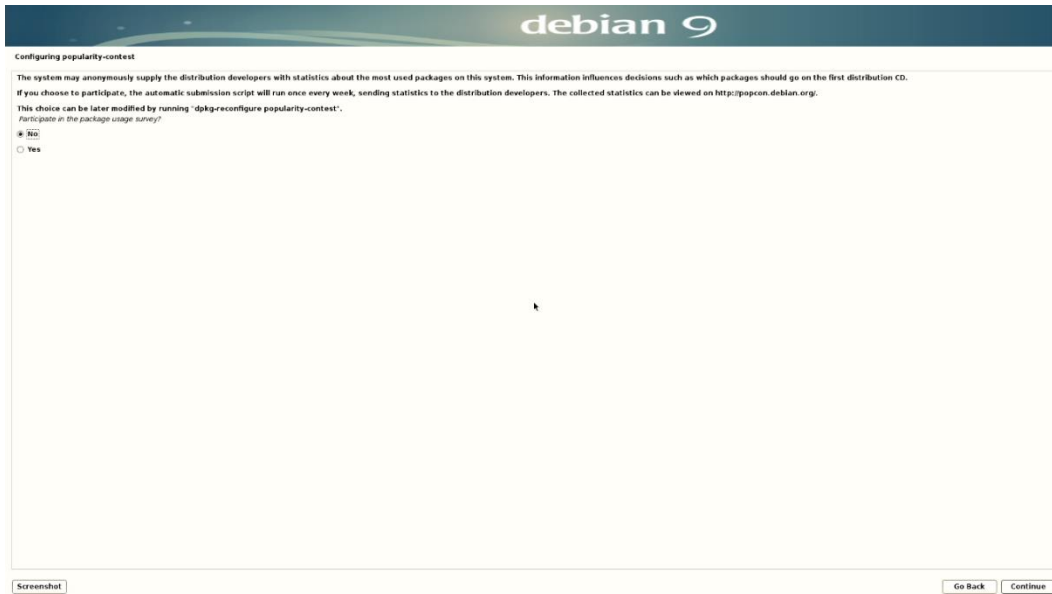
- Configure the package manager. Select “No” to avoid scanning another CD or DVD.



- Configure the package manger by selecting a debian archive mirror.



- Configuring popularity-contest.



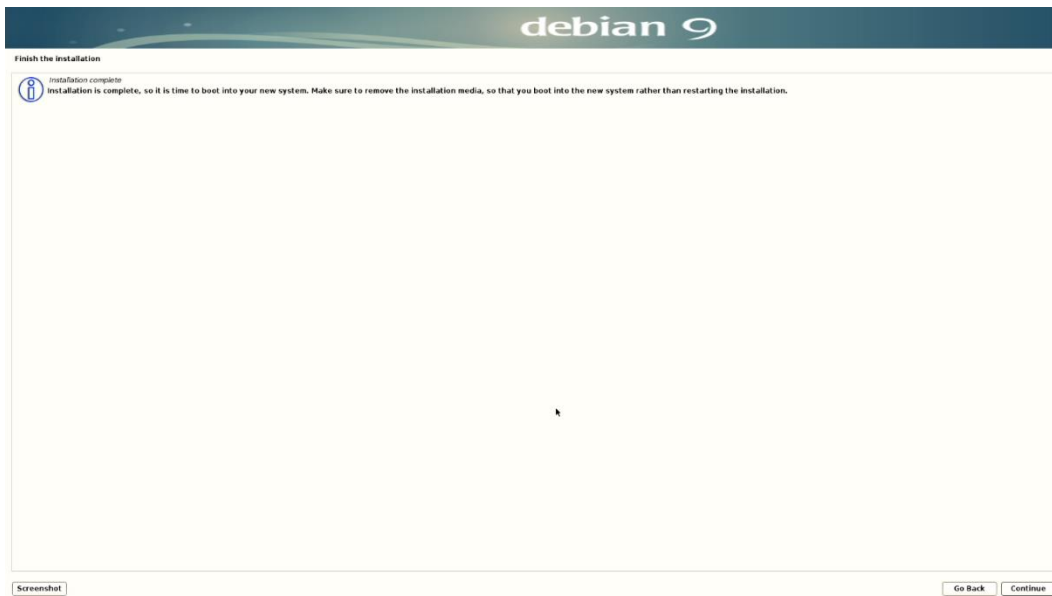
- Software selection.



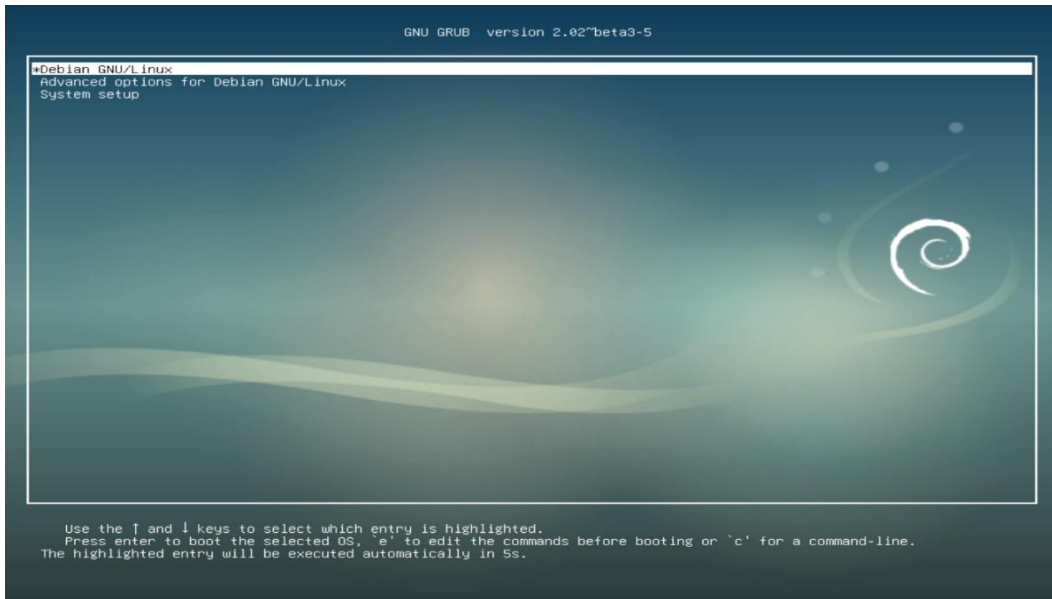
- Let the installer start the installation.



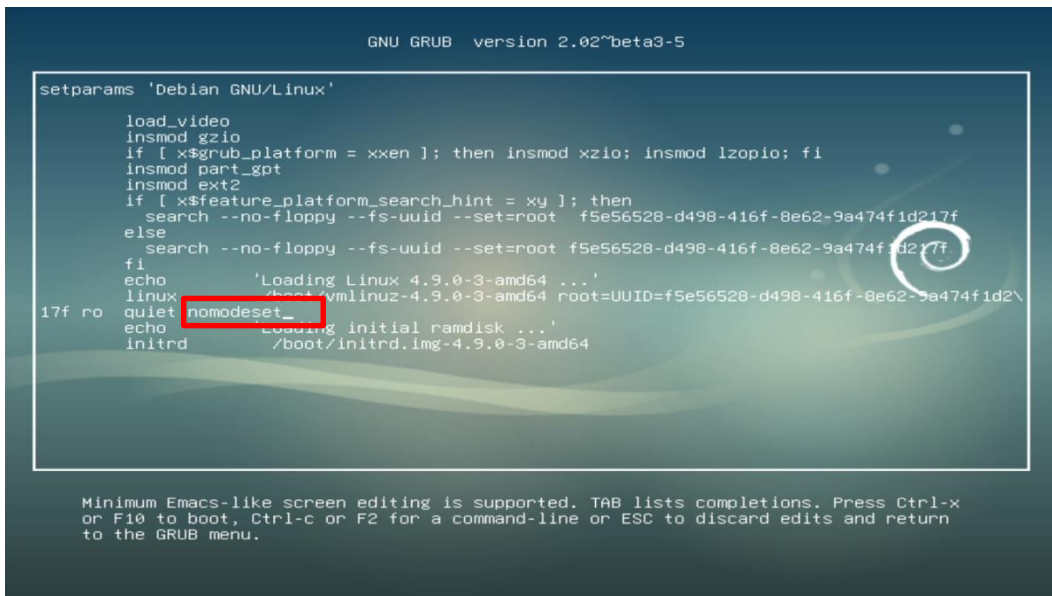
- Select "Continue" at the "Installation complete" screen to reboot the system.



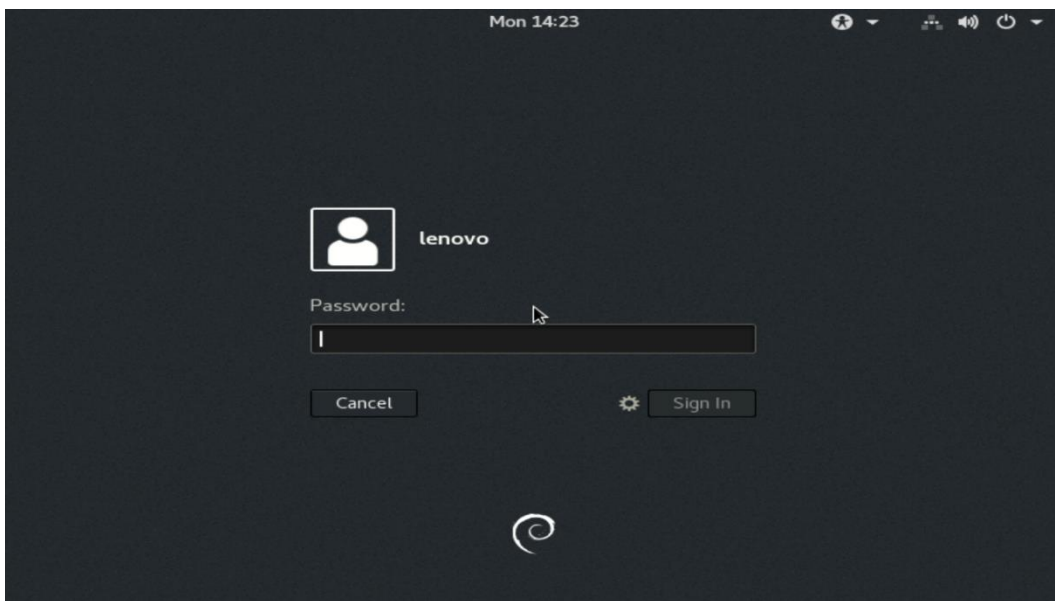
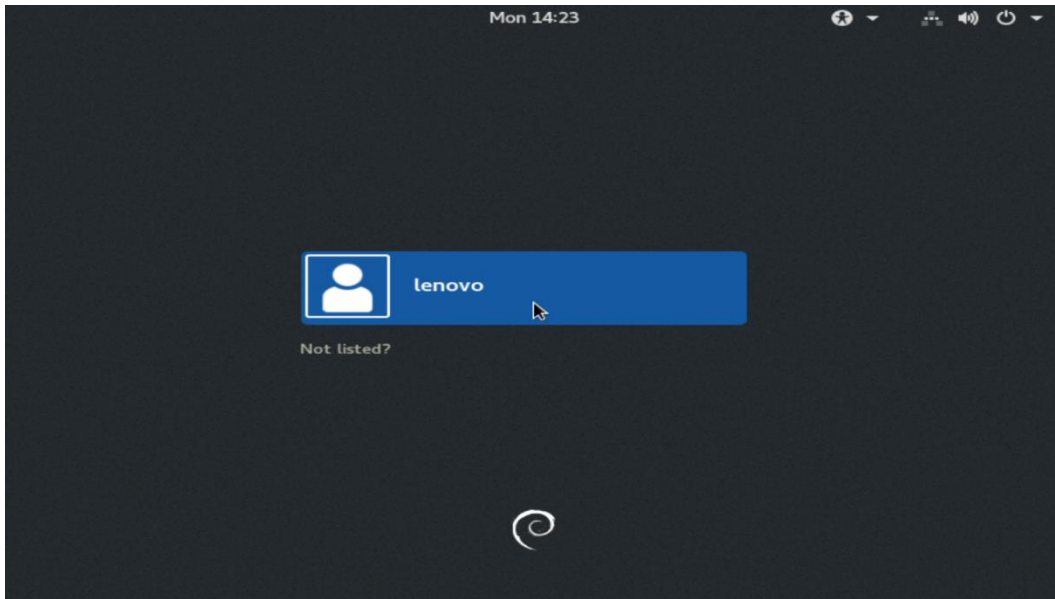
- At the grub boot menu screen, press “e” to edit the boot parameters.



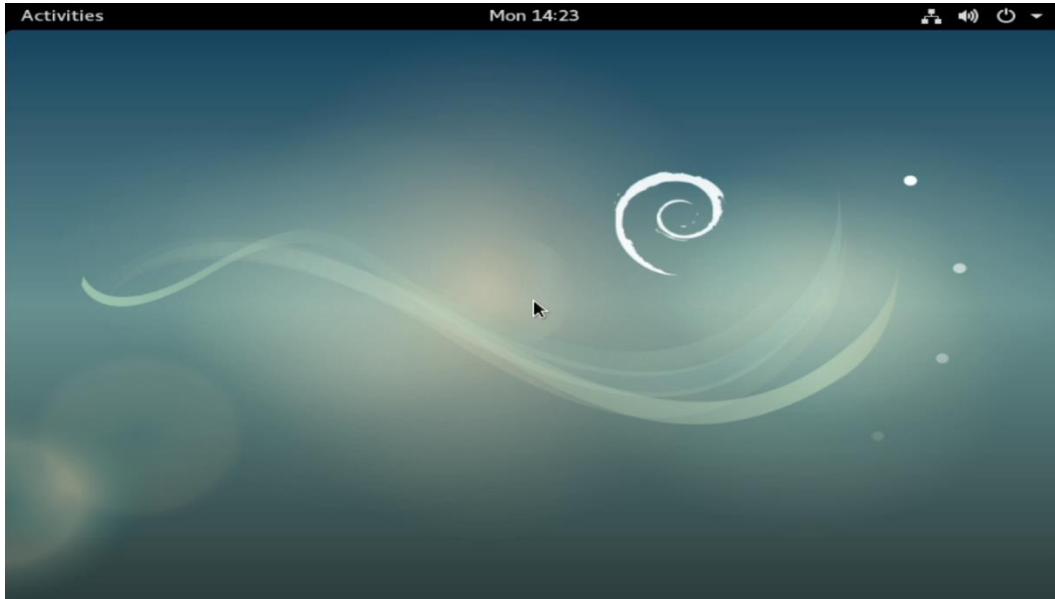
- Add “nomodeset” at the end of the boot parameter line, then press F10 to boot.



- Log in to the Debian desktop screen by using the user credentials created above.



- Debian desktop screen.



Section 3 – Updating the Source List to use the Debian Repositories

Use the debian repositories to download quick driver and/or software package releases.

Here's an example of what an `/etc/apt/sources.list` might look like:

Step 1:

- Edit the following file `'/etc/apt/sources.list'` and add the following lines:

```
deb http://deb.debian.org/debian stretch main
deb-src http://deb.debian.org/debian stretch main
deb http://deb.debian.org/debian stretch-updates main
deb-src http://deb.debian.org/debian stretch-updates main
deb http://security.debian.org/ stretch/updates main
deb-src http://security.debian.org/ stretch/updates main

deb http://deb.debian.org/debian stretch main contrib non-free
deb-src http://deb.debian.org/debian stretch main contrib non-free
deb http://deb.debian.org/debian stretch-updates main contrib non-free
deb-src http://deb.debian.org/debian stretch-updates main contrib non-free
deb http://security.debian.org/ stretch/updates main contrib non-free
deb-src http://security.debian.org/ stretch/updates main contrib non-free
```

Step 2:

- Run the following command: `'apt-get update'`

Section 4 – 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 Nvidia driver from Debian repository, use the command: *apt-get install nvidia-driver*

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

Prerequisites

- Make sure ***gcc*** is installed.
 - o # apt-get install gcc
- Make sure ***make*** is installed.
 - o # apt-get install make
- Make sure ***linux-headers*** are installed.
 - o # apt-get install linux-headers-*"uname -r"*

Step 1:

- Download the Nvidia graphics driver from Nvidia's website.

Step 2:

- Press "ALT-F2" on the keyboard.

Step 3:

- Login as root.
 - o # sudo su -

Step 4:

- Exit X-Windows/X-Server.
 - o # init 3

Step 5:

- Run the Nvidia installer.
 - o # sh Nvidia-*



Step 6:

- Accept the Nvidia driver license.

```
NVIDIA Accelerated Graphics Driver for Linux-x86_64 (375.66)

Please read the following LICENSE and then select either "Accept" to accept the license and continue with the installation,
or select "Do Not Accept" to abort the installation.

  Accept  Do Not Accept

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NVIDIA Software License Top
```

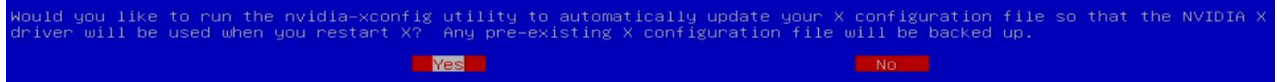
```
NVIDIA Accelerated Graphics Driver for Linux-x86_64 (375.66)

Building kernel modules
-----
100%

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

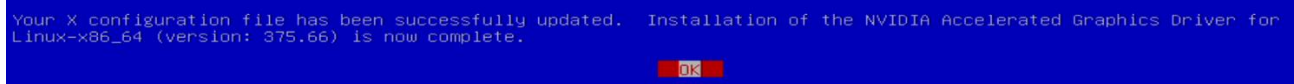
Step 7:

- Select “Yes” to update your X configuration file.



Step 8:

- Driver installation complete.



Step 9:

- Verify the Nvidia driver is loaded.

```
root@debian:/home/lenovo/Desktop# nvidia-smi
Wed May 24 15:53:10 2017

+-----+
| NVIDIA-SMI 375.66                  Driver Version: 375.66          |
+-----+-----+
| 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 P600     Off       | 0000:01:00.0  Off  |      0%      N/A   |
|  0%   54C    P0      13W /  N/A   |  0MiB / 1995MiB |      0%      Default |
+-----+-----+

+-----+
| Processes:                         GPU Memory |
|   GPU       PID    Type    Process name                     Usage |
+-----+-----+
| No running processes found         |
+-----+

root@debian:/home/lenovo/Desktop#
```

Step 10:

- Reboot the system.

Section 5 – Installing the Network Wireless Driver

The wireless network device offered for P520c-P520-P720-P920 is native to Debian; therefore, you will not need to install any additional drivers separately.

Section 6 – Installing the Network LAN Driver

The wireless network device is native to Debian; therefore, you will not need to install any additional drivers separately.