

Ubuntu Linux Setup Guide

For ThinkStation P520c-P520-P720-P920

Lenovo™



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).



- 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 bottom of the screen features the Lenovo logo, the text "UEFI Setup Utility", and the version information: "Version 1.01.0040. Copyright (C) 2017 American Megatrends, Inc."



- Select F10 to “Save and Exit” BIOS.

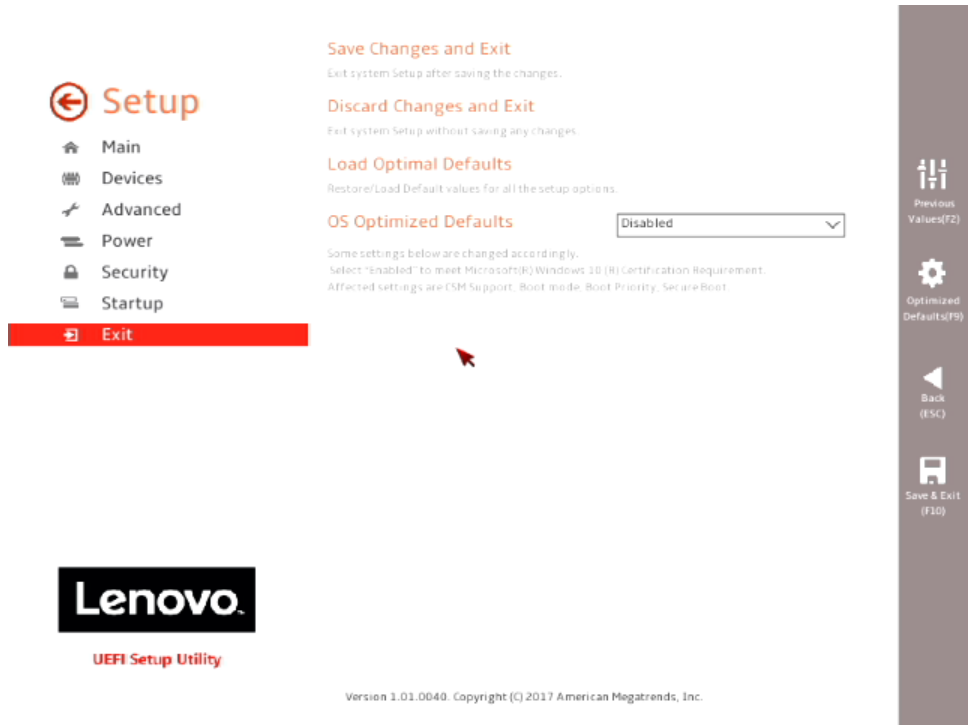
- **For UEFI/GPT installations (recommended):**
 - Boot into BIOS by pressing the function F1 key at the “Lenovo” splash screen.
 - Select “Setup” from the screen indicated below.

Lenovo™

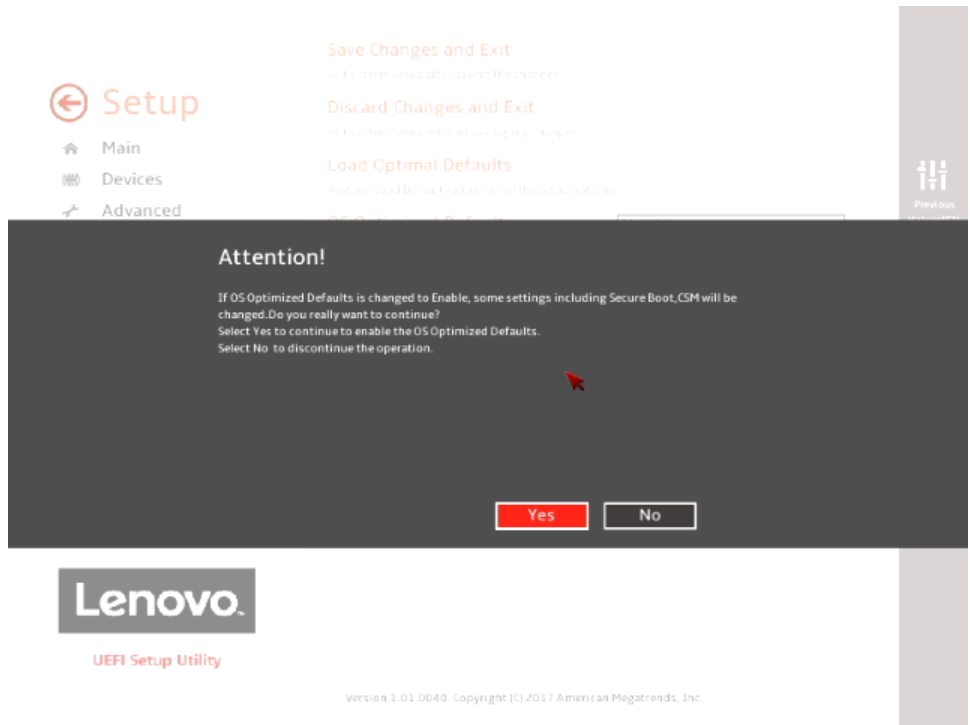
ThinkStation®



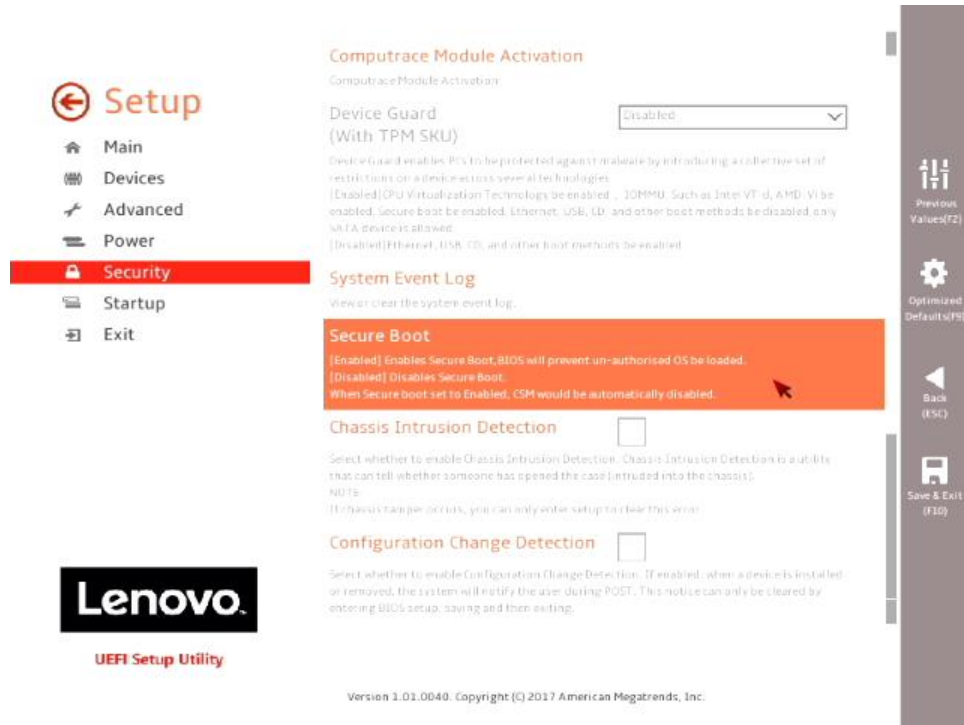
- Select “Exit” menu option (left) and set “OS Optimized Defaults” (right) to “Enabled”.



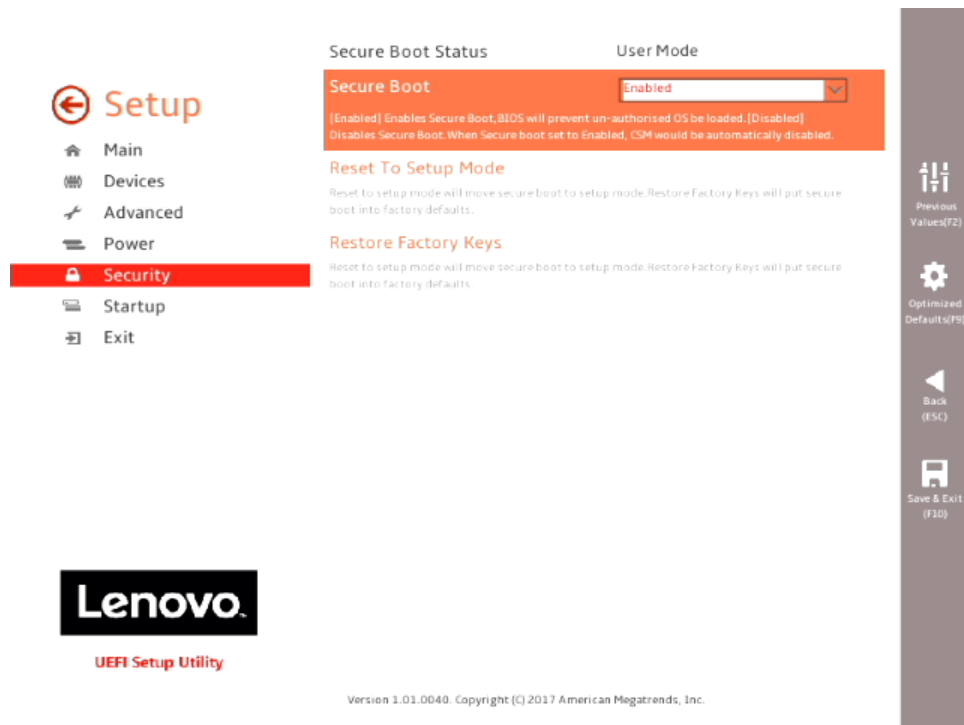
- Select “Yes” at the confirmation screen indicated below.



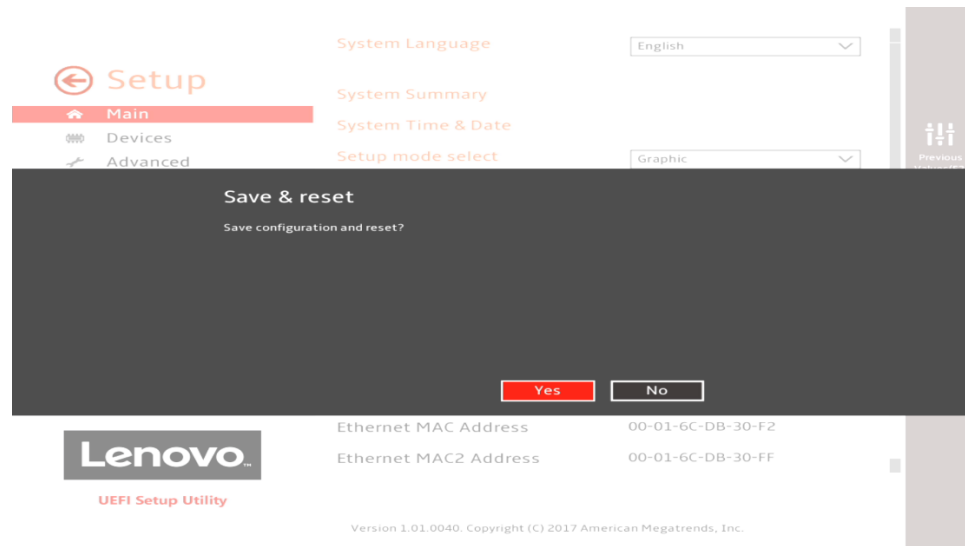
- Select the “Security” menu option (left), then select “Secure Boot” option (right).



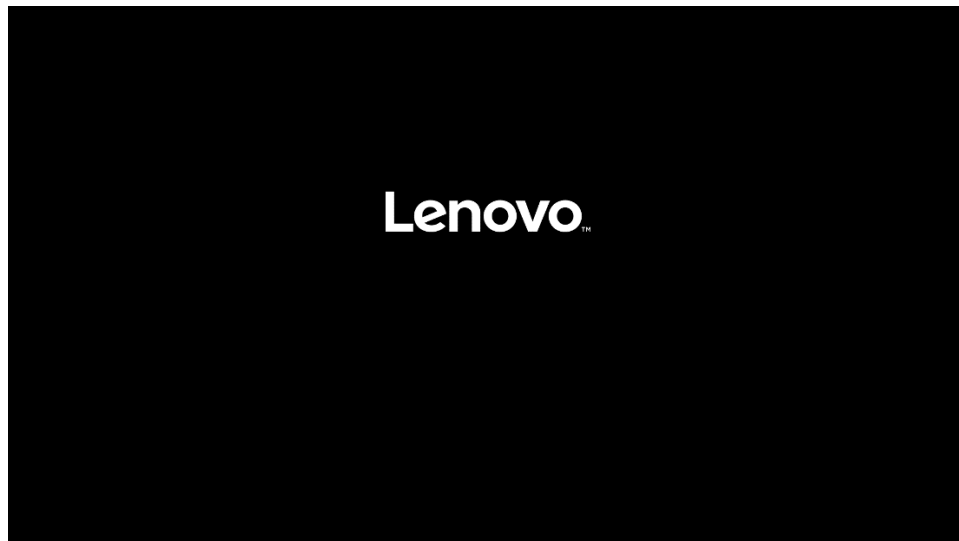
- Disable “Secure Boot”.



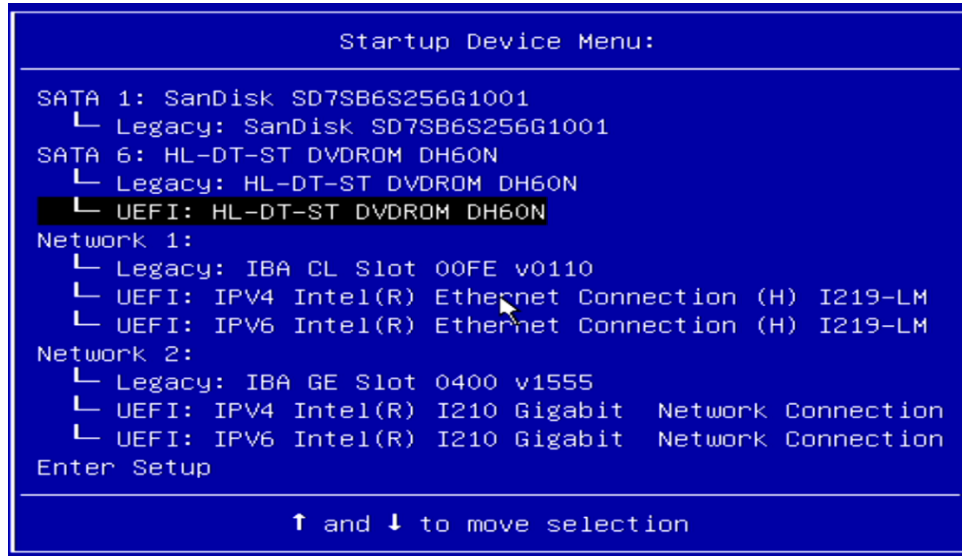
- Select F10 to “Save and Exit” BIOS.



- Insert the Ubuntu 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.

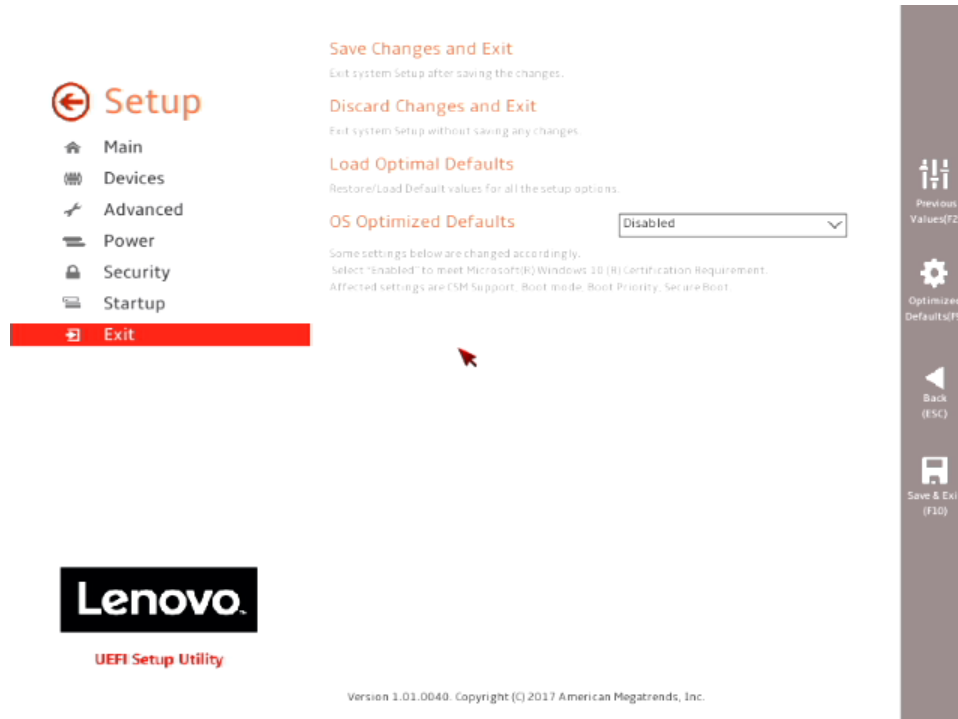


- **For Legacy/MBR installations (not recommended):**
 - Boot into BIOS by pressing the function F1 key at the “Lenovo” splash screen.
 - Select “Setup” from the screen indicated below.



Version 1.01.0040. Copyright (C) 2017 American Megatrends, Inc.

- 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

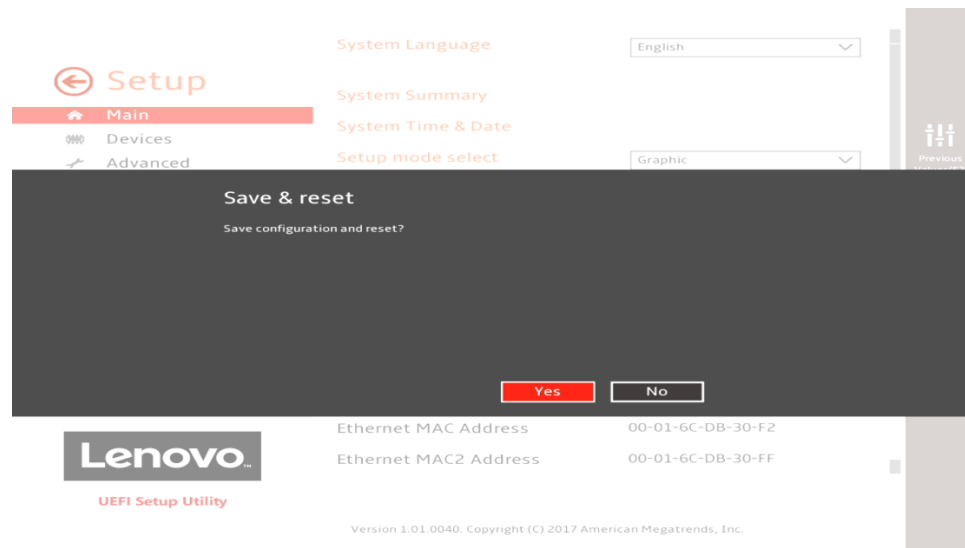
Video
Controls the execution of UEFI and Legacy Video OpROM

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

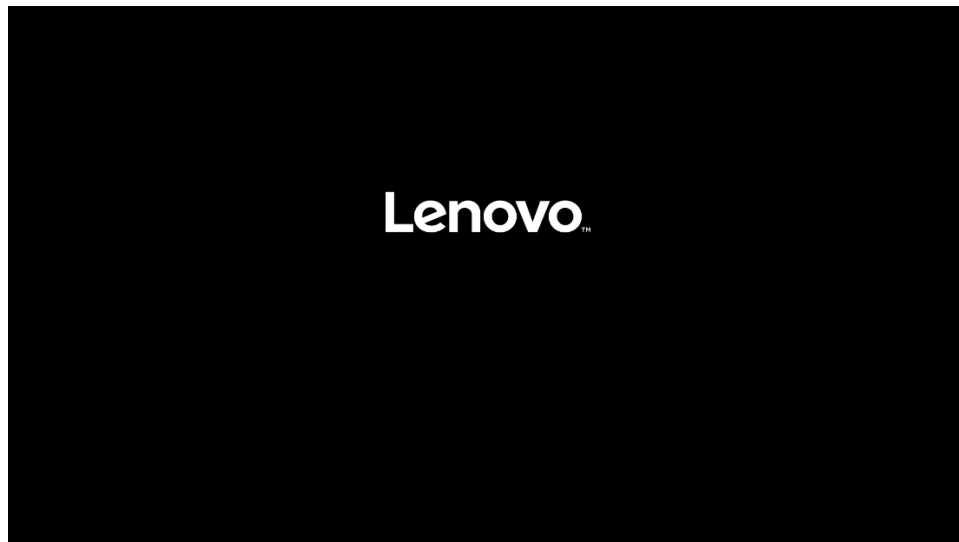
Version 1.01.0040. Copyright (C) 2017 American Megatrends, Inc.

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

- Select F10 to “Save and Exit” BIOS.



- Insert the Ubuntu 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

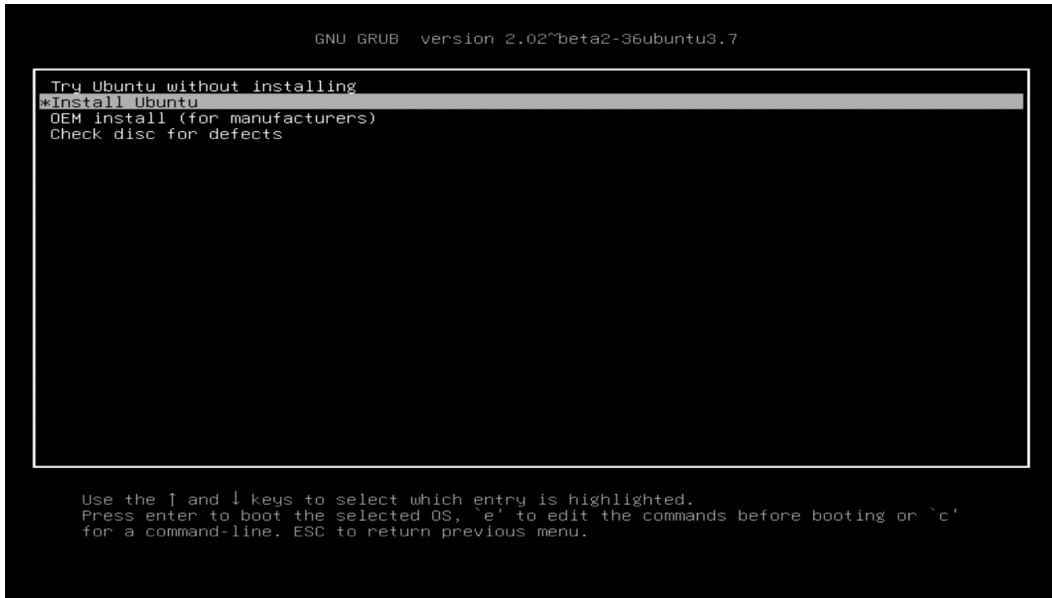
↑ and ↓ to move selection
```



Section 2 – Installing Ubuntu 16.04 LTS

Please refer to the following instructions and screenshots on how to install Ubuntu 16.04 LTS on the ThinkStation P520c, P520, P720, and P920 workstations.

- Highlight the “*Install Ubuntu*” from the Installer menu and press Enter.

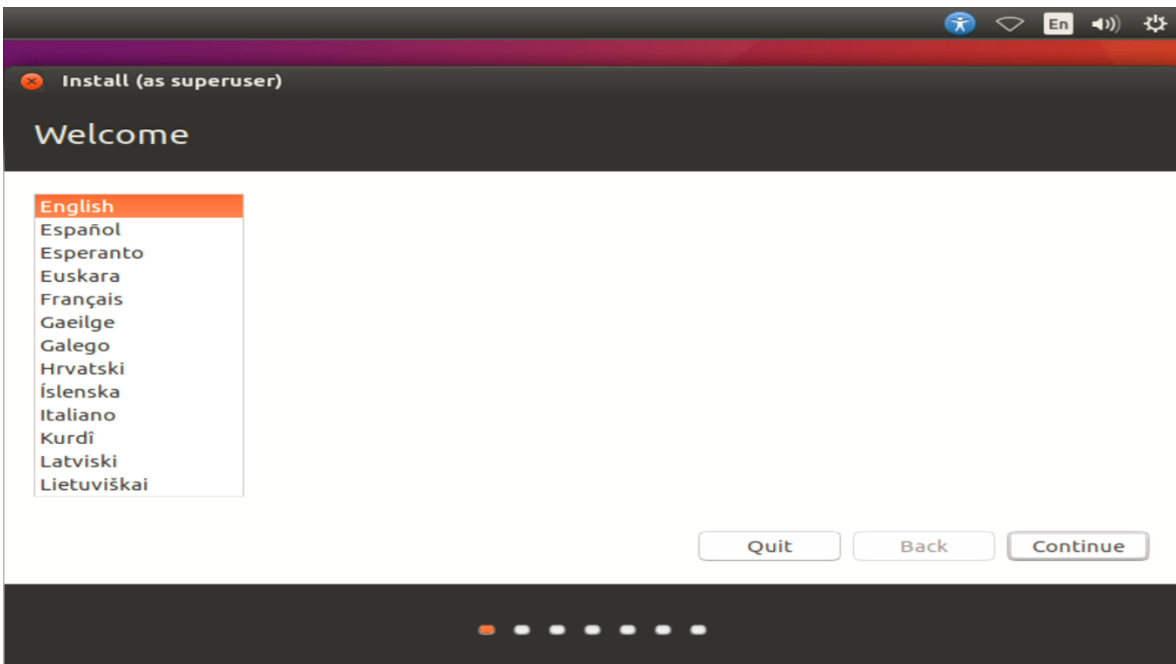


- With Intel Kaby-Lake CPU's, the following warning message may appear.

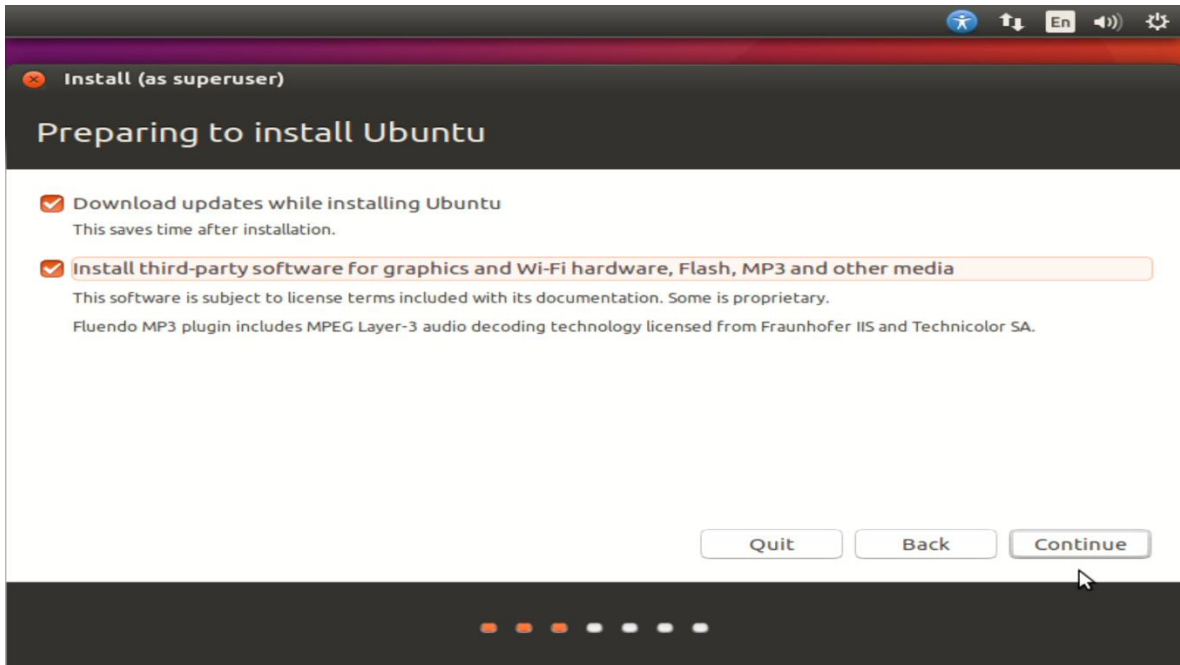




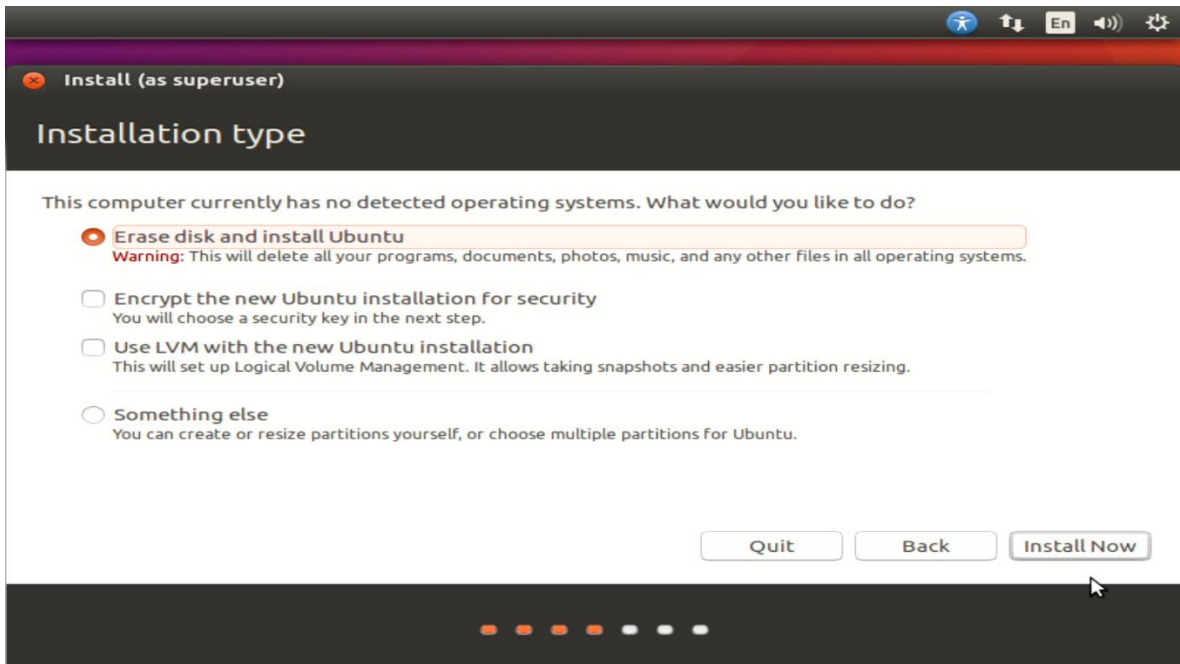
- Select the language to use during the installation process.



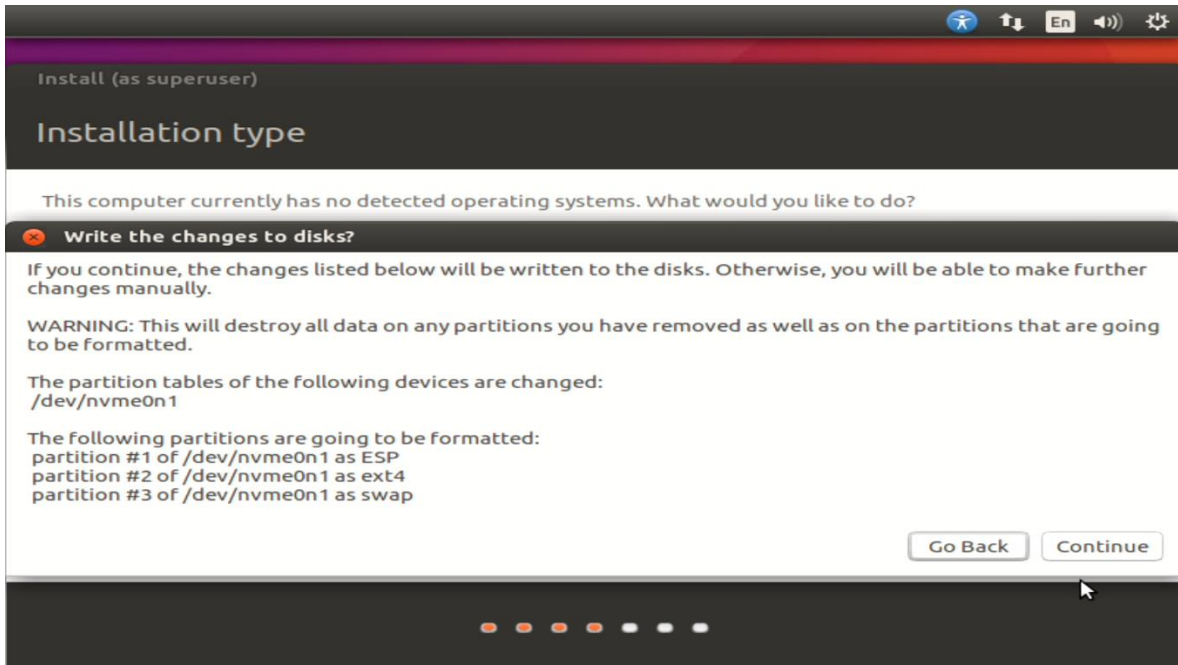
- Optional: Select options to install updates automatically and select “Continue”.



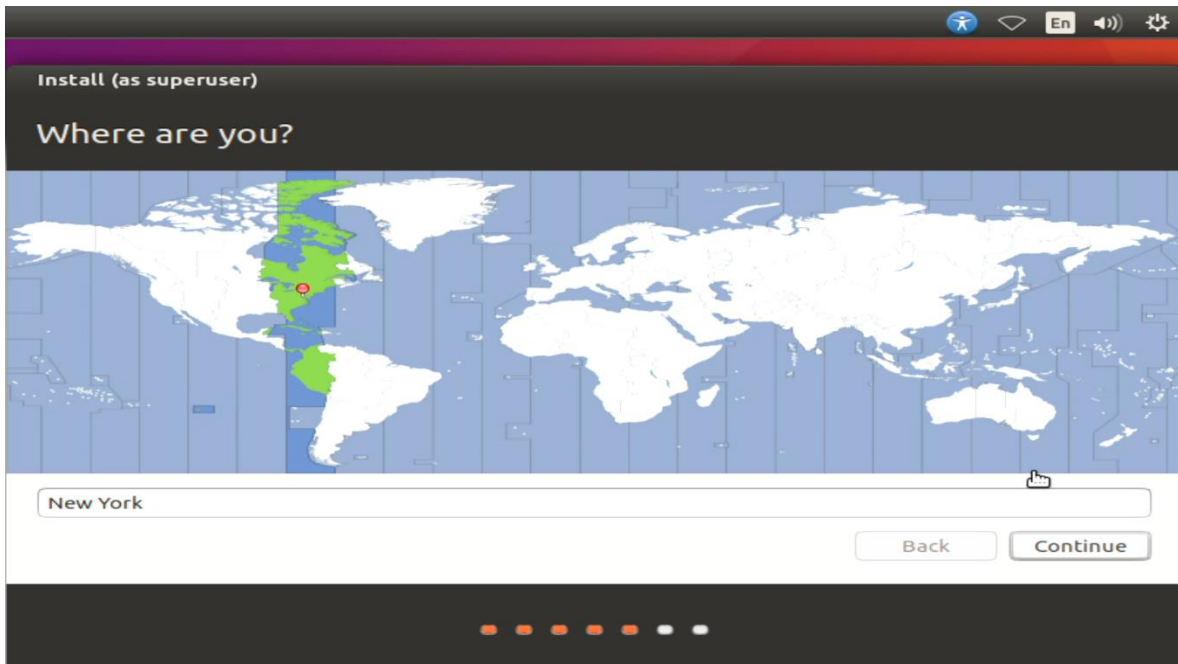
- Select “Erase disk and install Ubuntu” option and “Install Now”.



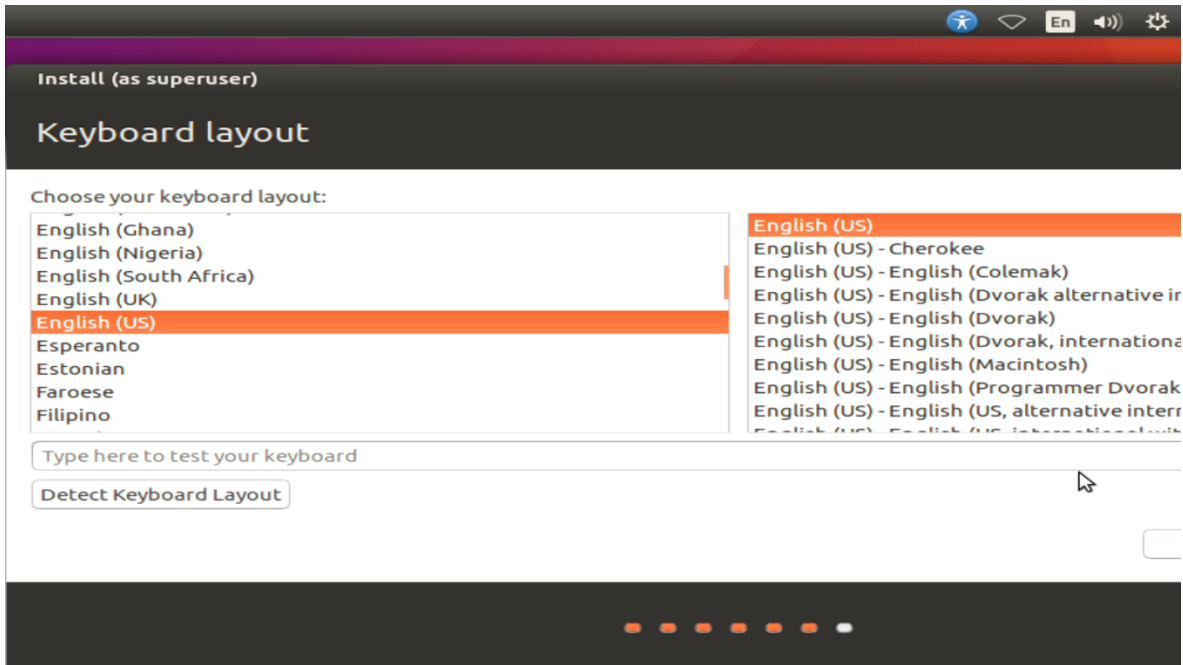
- Select “Continue” to confirm making changes to the disk.



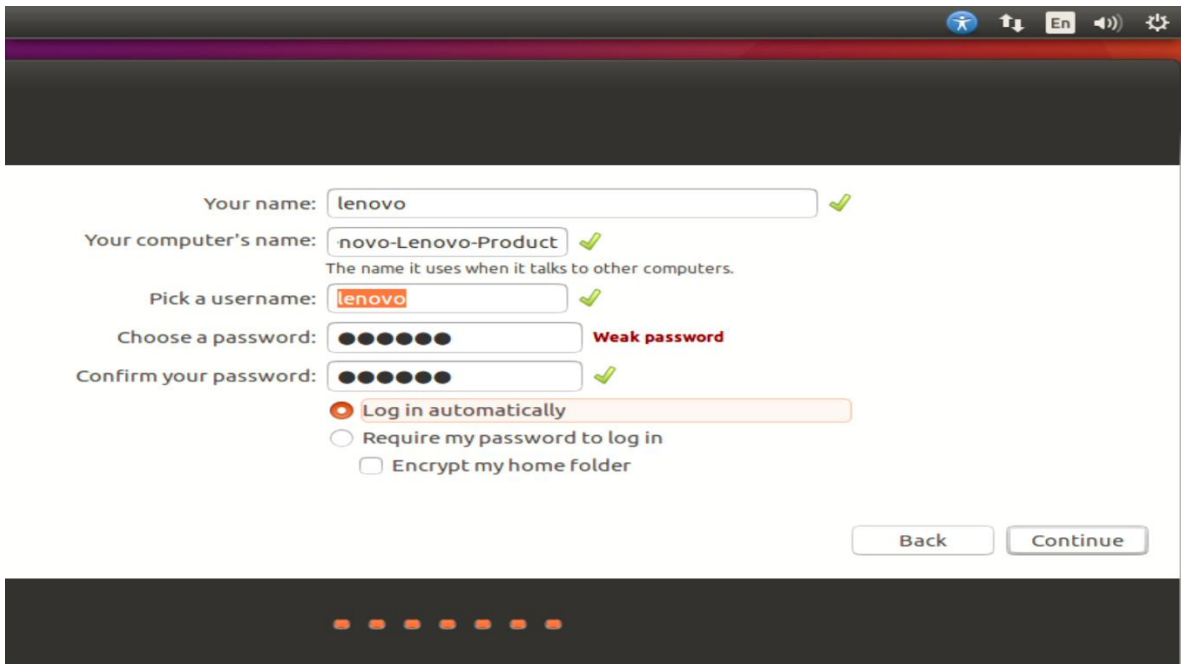
- Select your location from the map.



- Select your keyboard layout.



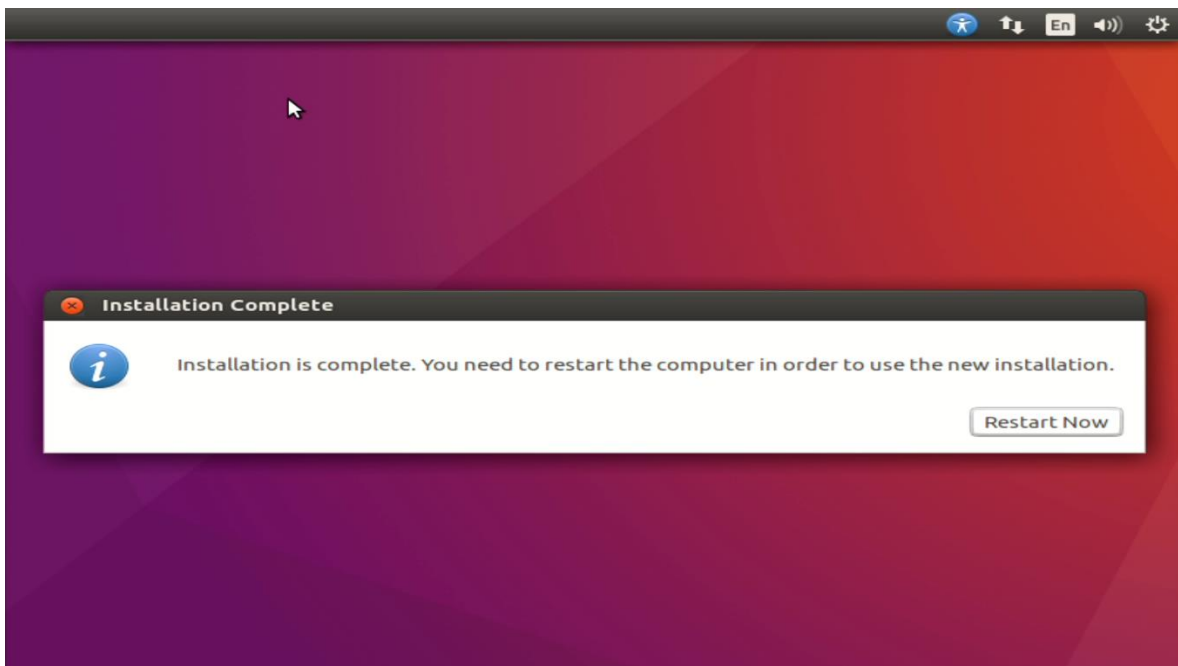
- Enter a Username and Password and select "Continue".



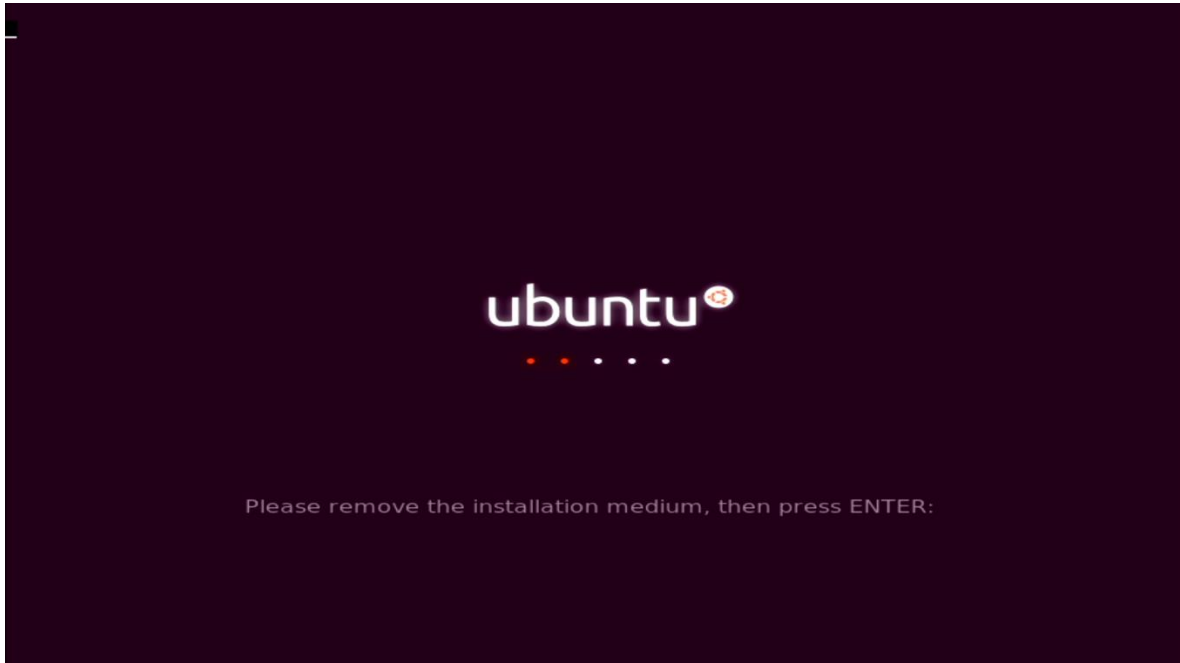
- Installing Ubuntu.



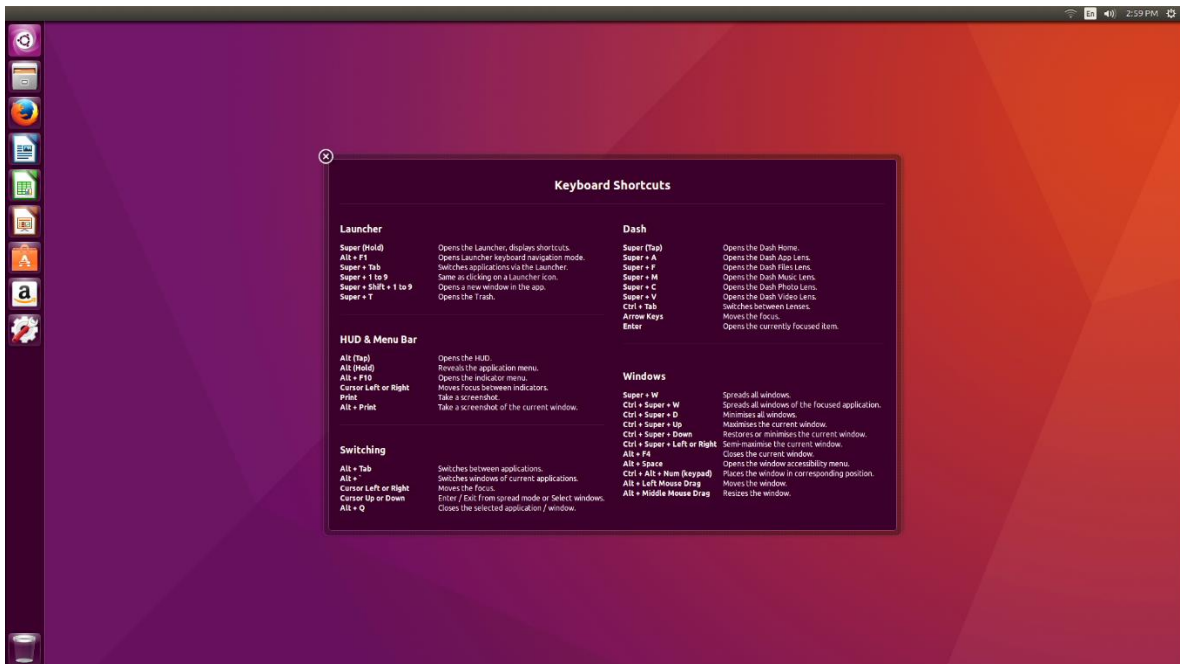
- Installation Complete. Select "Restart Now".



- Remove installation media and press ENTER.



- Ubuntu desktop screen.



Section 3 – 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 Nvidia graphics driver from the Lenovo Support Website.
<http://pcsupport.lenovo.com/us/en/products/WORKSTATIONS/THINKSTATION-P-SERIES-WORKSTATIONS/THINKSTATION-P320/downloads/DS121444>
- **Step 2:**
 - Blacklist the Linux Nouveau driver.
 - Edit /etc/modprobe.d/blacklist.conf and add the line “**blacklist nouveau**”.
 - Run the command from a terminal window: **update-initramfs -u**
 - Reboot the system.
- **Step 3:**
 - Press “Ctrl-Alt-F2”, login as root and stop the x-server by running “**service lightdm stop**”.
- **Step 4:**
 - Browse to the directory location to where the Nvidia driver installer is located.
- **Step 5:**
 - Run the Nvidia installer.

```
root@lenovo-Lenovo-Product:/home/lenovo/Desktop# ls
NVIDIA-Linux-x86_64-375.61.run
root@lenovo-Lenovo-Product:/home/lenovo/Desktop# ./NVIDIA-Linux-x86_64-375.61.run
```

- **Step 6:**
 - Accept the Nvidia driver license.

```
NVIDIA Accelerated Graphics Driver for Linux-x86_64 (375.61)

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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IMPORTANT NOTICE -- READ CAREFULLY: This License For Customer Use of
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hardware on a graphics controller board, and a personal computer. The
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treaties, as well as other intellectual property laws and treaties.
The SOFTWARE is not sold, and instead is only licensed for use,
strictly in accordance with this document. The hardware is protected
by various patents, and is sold, but this agreement does not cover
that sale, since it may not necessarily be sold as a package with
the SOFTWARE. This agreement sets forth the terms and conditions
of the SOFTWARE LICENSE only.

1. DEFINITIONS

NVIDIA Software License Top
```

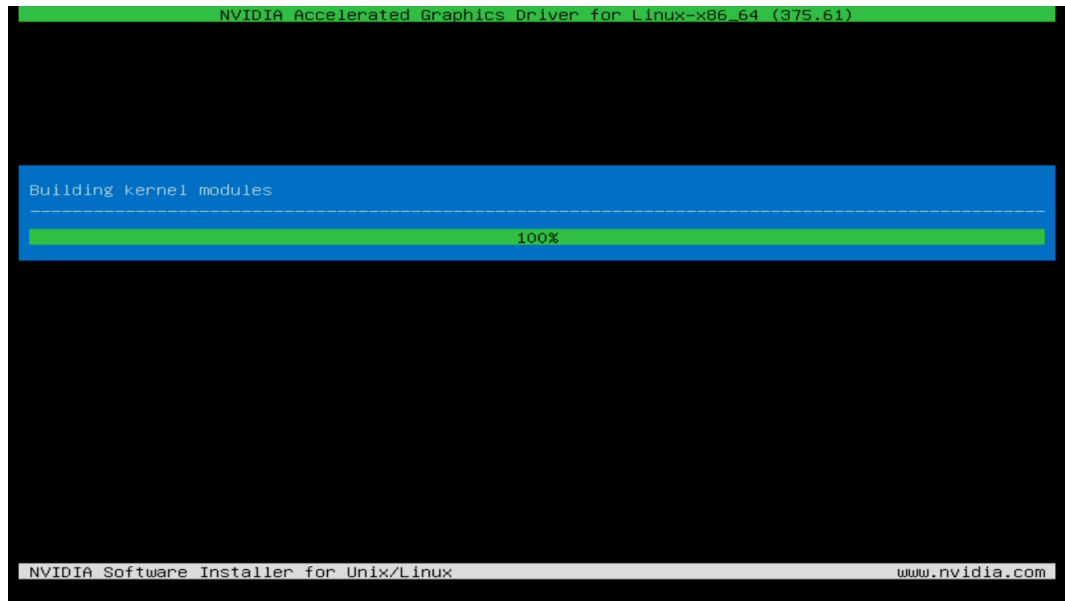
- **Step 7:**
 - Continue the installation.

```
NVIDIA Accelerated Graphics Driver for Linux-x86_64 (375.61)

The distribution-provided pre-install script failed! Are you sure you want to continue?

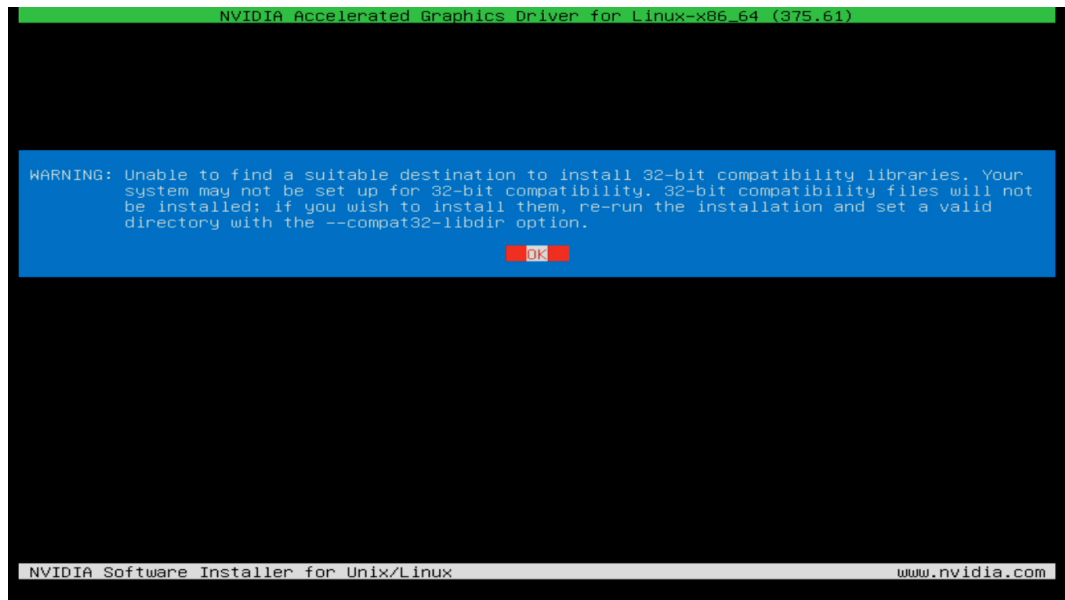
Continue installation Abort installation

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

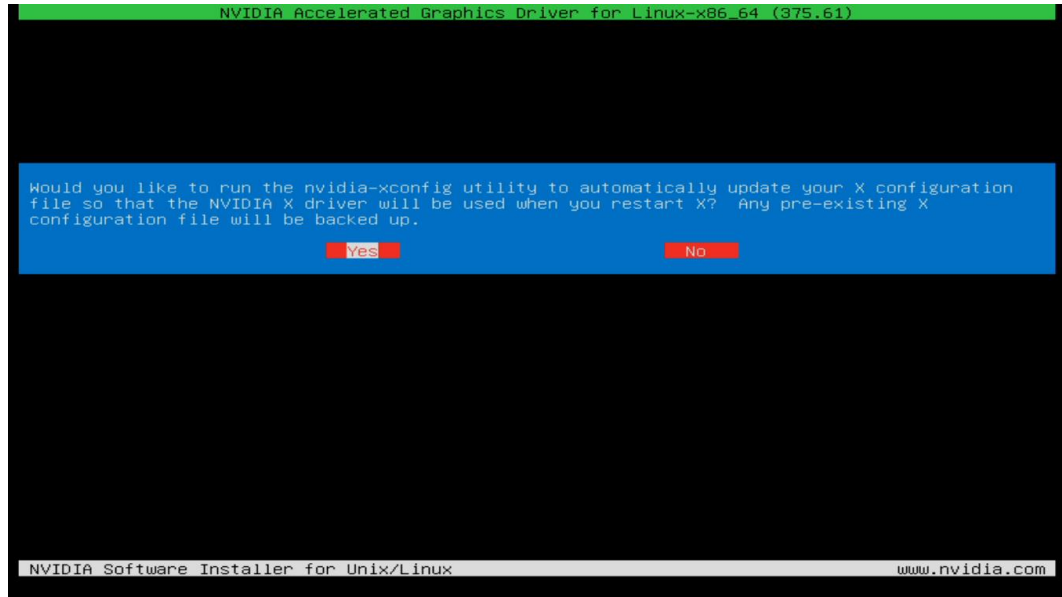


- **Step 8:**

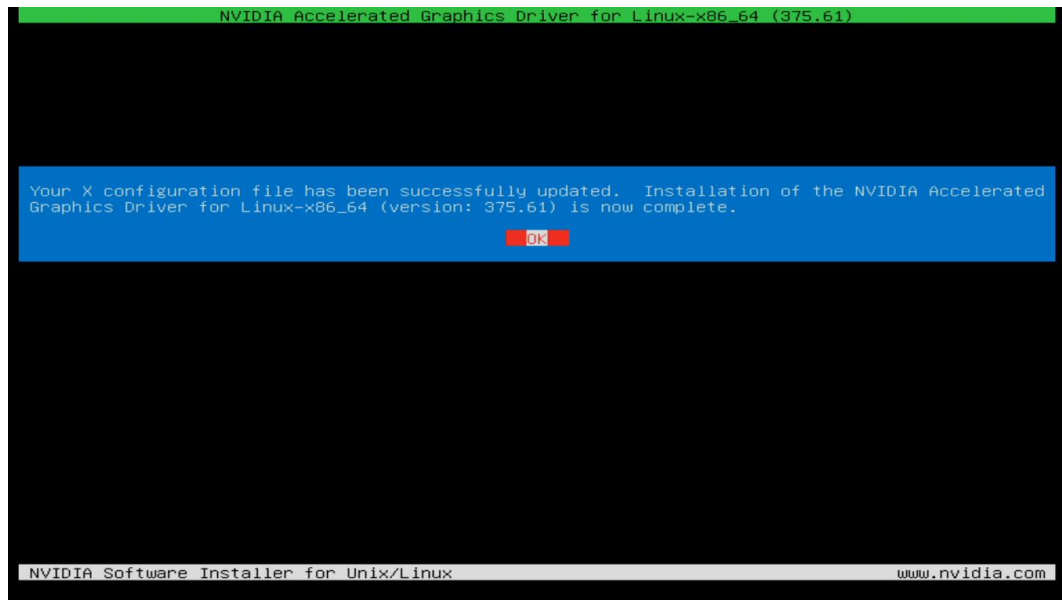
- Select "OK".



- **Step 9:**
 - Select “Yes” to update the X-configuration file.



- **Step 10:**
 - Driver installation complete.



- **Step 11:**
 - Verify the Nvidia driver is loaded by running “nvidia-smi”.

```
root@lenovo-Lenovo-Product:/home/lenovo/Desktop# nvidia-smi
Mon Jul 31 14:26:23 2017

+-----+
| NVIDIA-SMI 375.61              Driver Version: 375.61          |
+-----+-----+-----+-----+-----+-----+
| 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  |           0M /   1996M |      0%      Default |
+-----+-----+-----+-----+-----+-----+

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

root@lenovo-Lenovo-Product:/home/lenovo/Desktop# _
```

- **Step 12:**
 - Reboot the system.
- **Step 13:**
 - Verify the Nvidia driver is loaded properly from within X-windows.

```
Terminal
lenovo@lenovo-Lenovo-Product:~$ sudo su -
[sudo] password for lenovo:
lenovo@lenovo-Lenovo-Product:~$ nvidia-smi
Mon Jul 31 14:28:09 2017

+-----+
| NVIDIA-SMI 375.61              Driver Version: 375.61          |
+-----+-----+-----+-----+-----+-----+
| 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  |       178M /   1996M |      0%      Default |
+-----+-----+-----+-----+-----+-----+

Processes:
+-----+-----+-----+-----+-----+-----+
| GPU   PID  Type  Process name      | GPU Memory Usage |
+-----+-----+-----+-----+-----+-----+
|   0   989  G    /usr/lib/xorg/Xorg |      131M /      40M |
|   0   1417 G    compiz              |      40M /      40M |
+-----+-----+-----+-----+-----+-----+

lenovo@lenovo-Lenovo-Product:~$
```

Section 4 – Installing the Network Wireless Driver

The wireless network device offered for the P320 is native to Ubuntu 16.04 LTS; therefore, you will not need to install any additional drivers separately.

Section 5 – Installing the Network LAN Driver

The network LAN device is native to Ubuntu 16.04 LTS; therefore, you will not need to install any additional drivers separately.