Ubuntu 18.04 LTS 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.
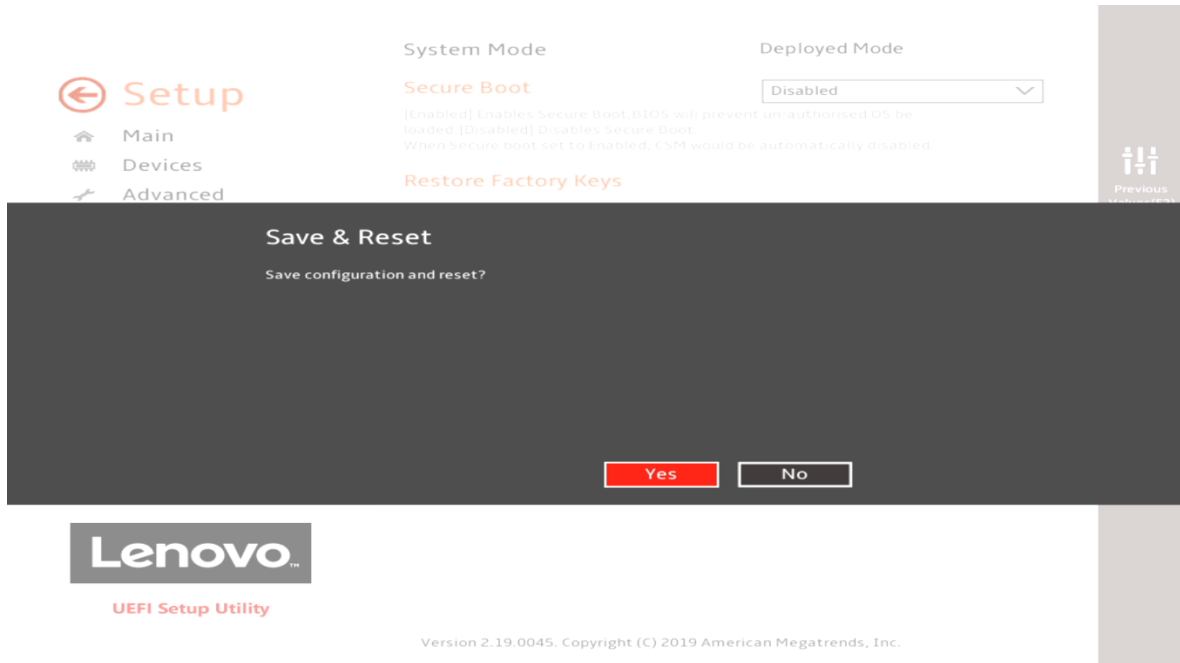
- **For UEFI/GPT installations (recommended)**:

  - Boot into BIOS by pressing the function F1 key at the "Lenovo" splash screen.

  - Select the "Exit" menu tab set "OS Optimized Defaults" to "Enabled" and select "Yes" at the confirmation screen.
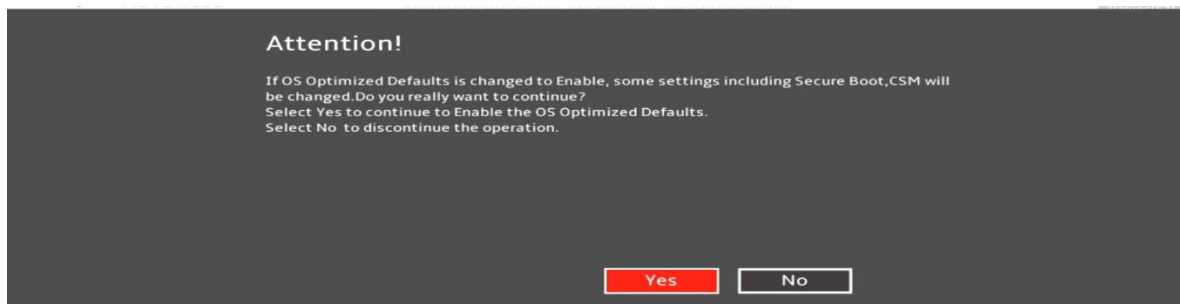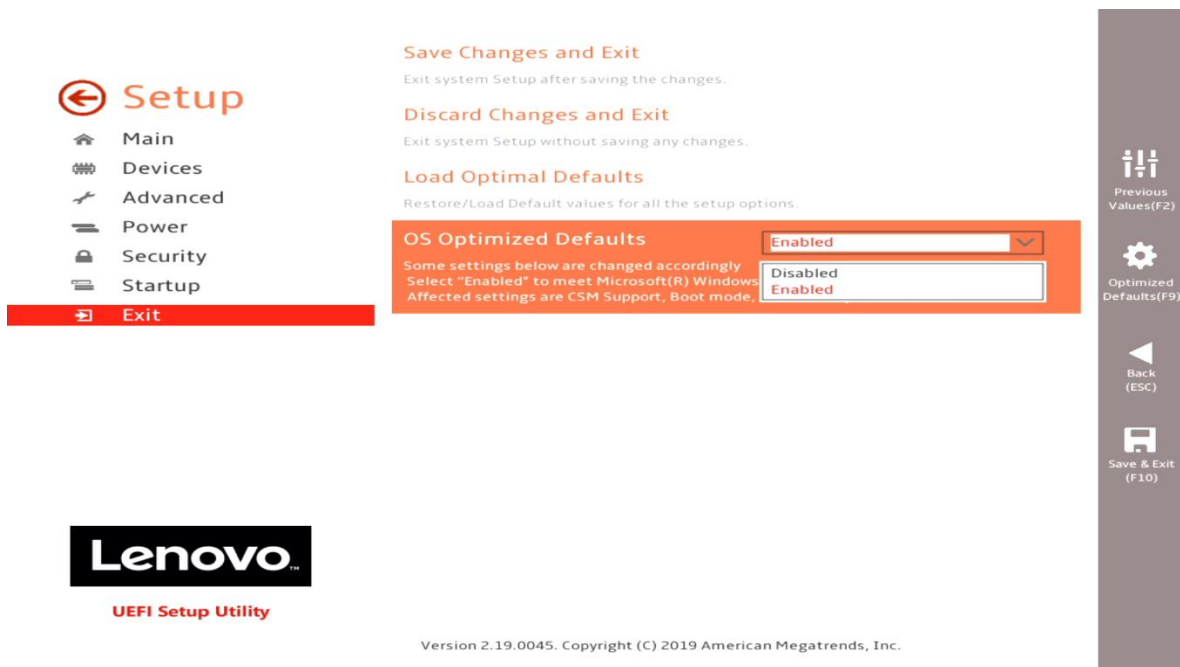
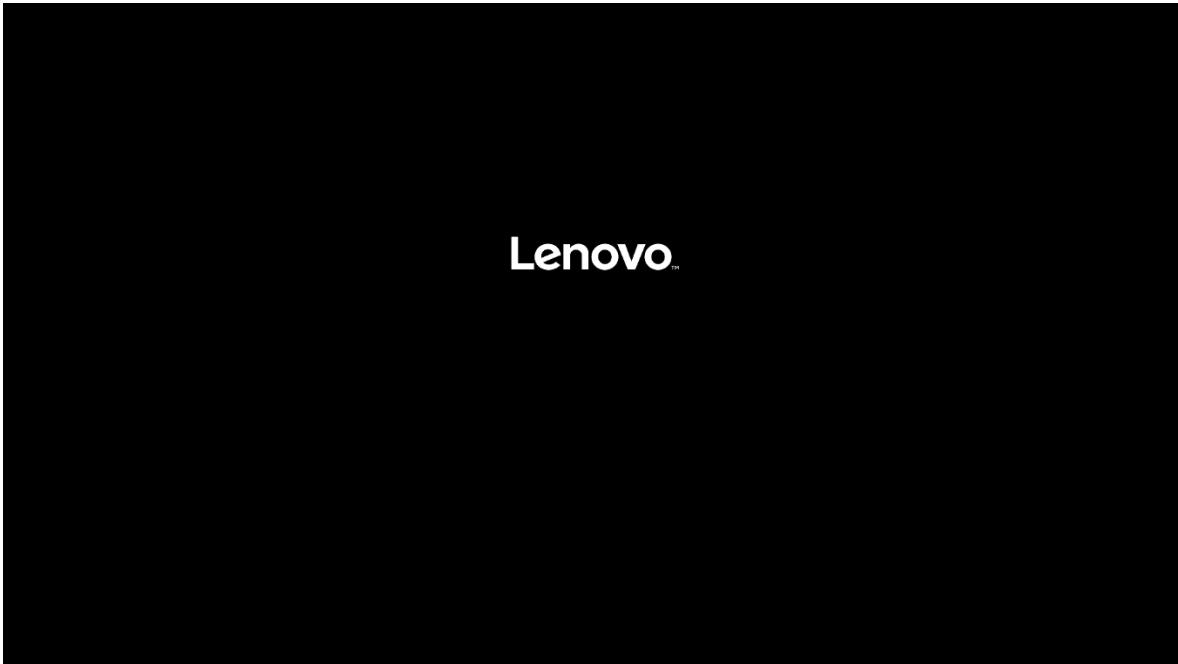o   Select the "Security" menu tab, select "Secure Boot", and set the option to "Disabled".

o   Press F10 to "Save and Exit" the BIOS setup menu.

o   Insert the Ubuntu install media (either through USB or CD/DVD).

o Power on the system and press the F12 function key whenever the following Lenovo splash screen appears.

o Select the Linux bootable installation media "UEFI" option from the F12 boot menu.

Startup Device Menu:

```
USB KEY:  Samsung Flash Drive 1100, Partition 1
    └ UEFI: Samsung Flash Drive 1100, Partition 1
Network 1:
    └ UEFI: IPV4 Intel(R) Ethernet Connection (2) I219-LM
    └ UEFI: IPV6 Intel(R) Ethernet Connection (2) I219-LM
Enter Setup

        ↑ and ↓ to move selection
```

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

  o Boot into BIOS by pressing the function F1 key at the "Lenovo" splash screen.

  o Select the "Exit" menu tab, set "OS Optimized Defaults" to "Disabled", and select "Yes" at the confirmation screen.
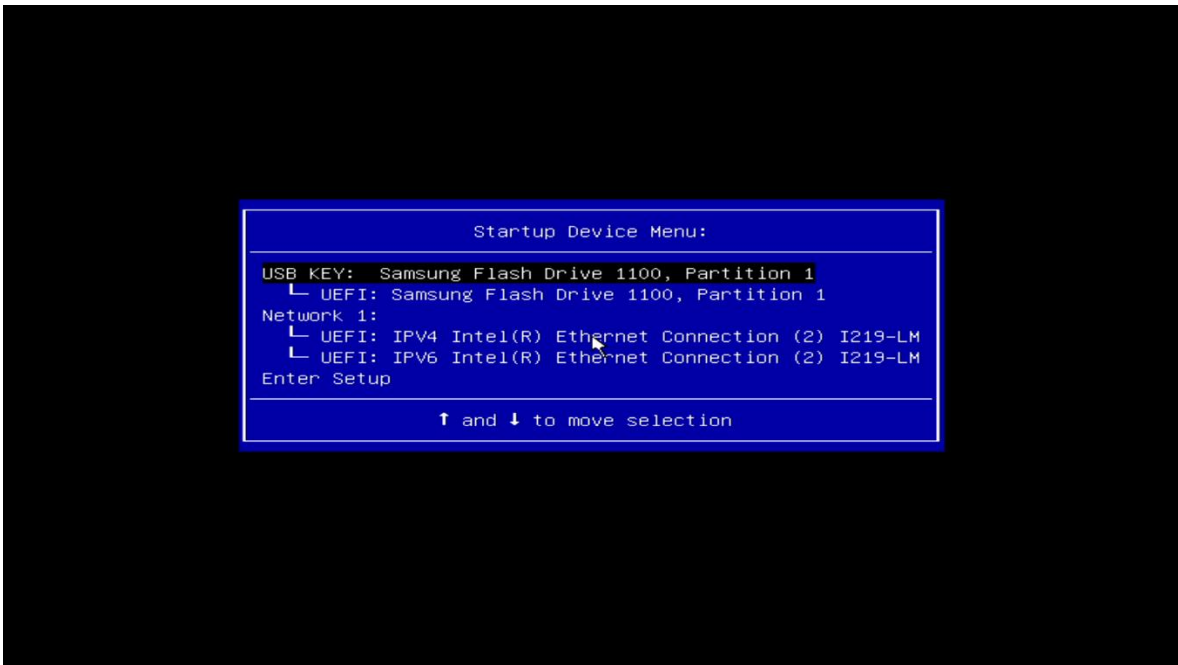

  o Select F10 to "Save and Exit" BIOS.

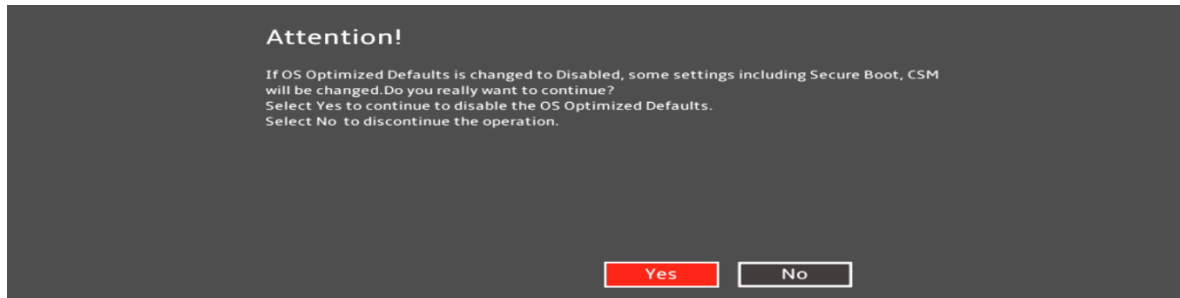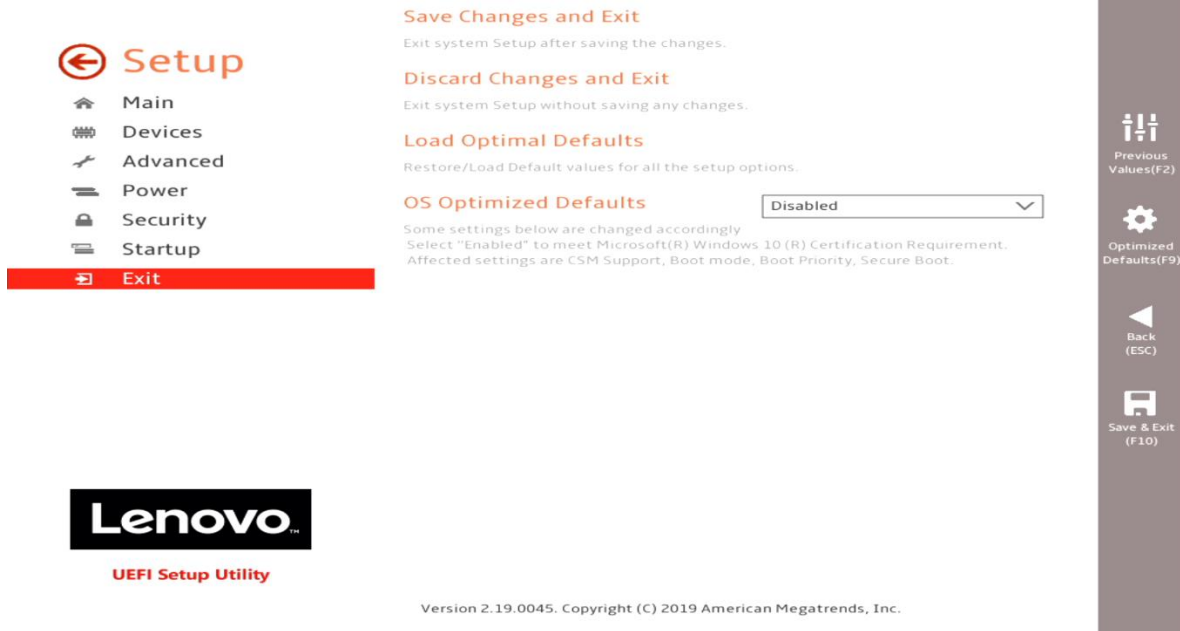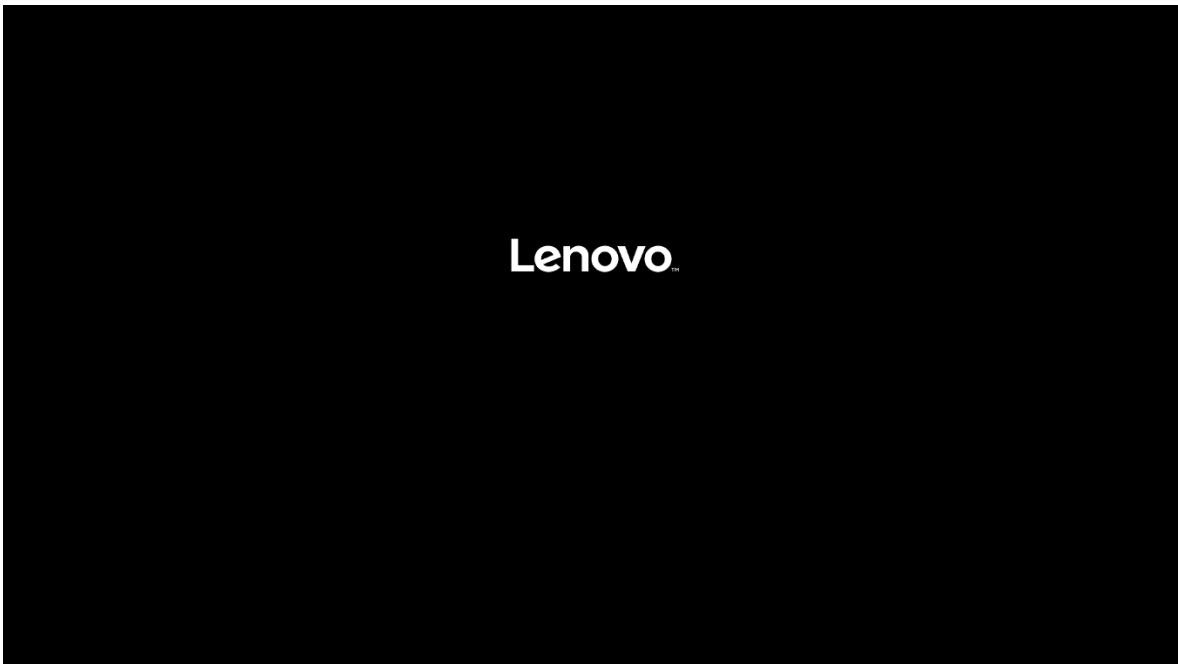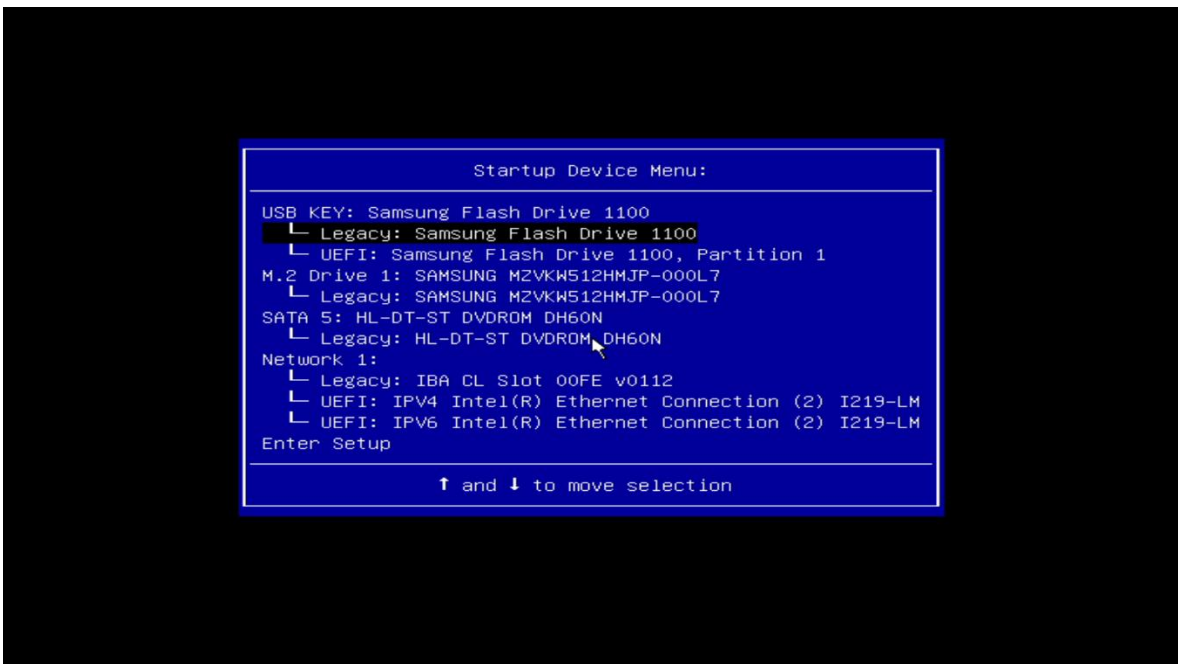 o Insert the Ubuntu install media (either through USB or CD/DVD).

o Power on the system and press the F12 function key whenever the following Lenovo splash screen appears.

o Select the Linux bootable installation media "Legacy" option from the F12 boot menu.

Startup Device Menu:

```
USB KEY: Samsung Flash Drive 1100
     └ Legacy: Samsung Flash Drive 1100
     └ UEFI: Samsung Flash Drive 1100, Partition 1
M.2 Drive 1: SAMSUNG MZVKW512HMJP-000L7
     └ Legacy: SAMSUNG MZVKW512HMJP-000L7
SATA 5: HL-DT-ST DVDROM DH60N
     └ Legacy: HL-DT-ST DVDROM DH60N
Network 1:
     └ Legacy: IBA CL Slot 00FE v0112
     └ UEFI: IPV4 Intel(R) Ethernet Connection (2) I219-LM
     └ UEFI: IPV6 Intel(R) Ethernet Connection (2) I219-LM
Enter Setup

          ↑ and ↓ to move selection
```
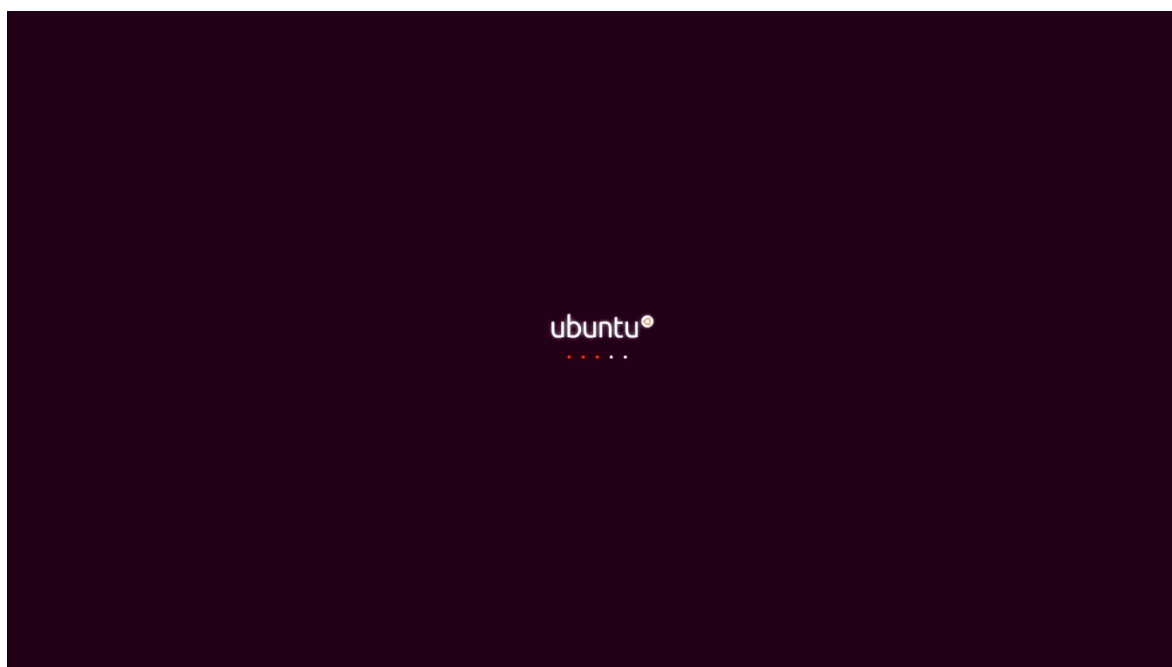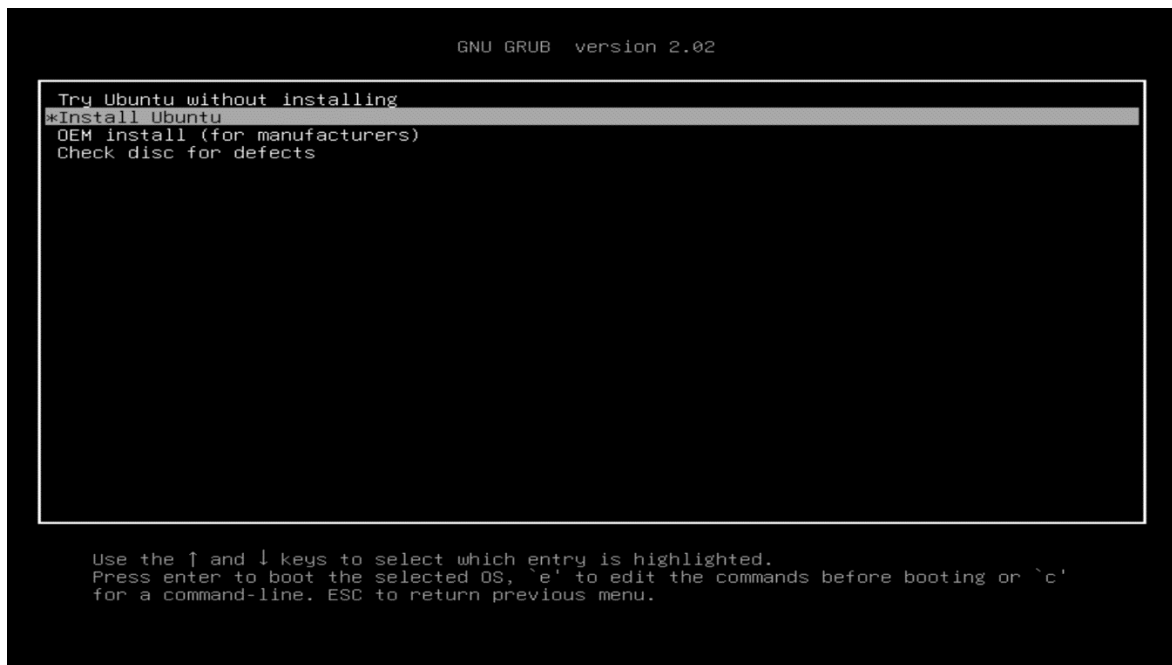
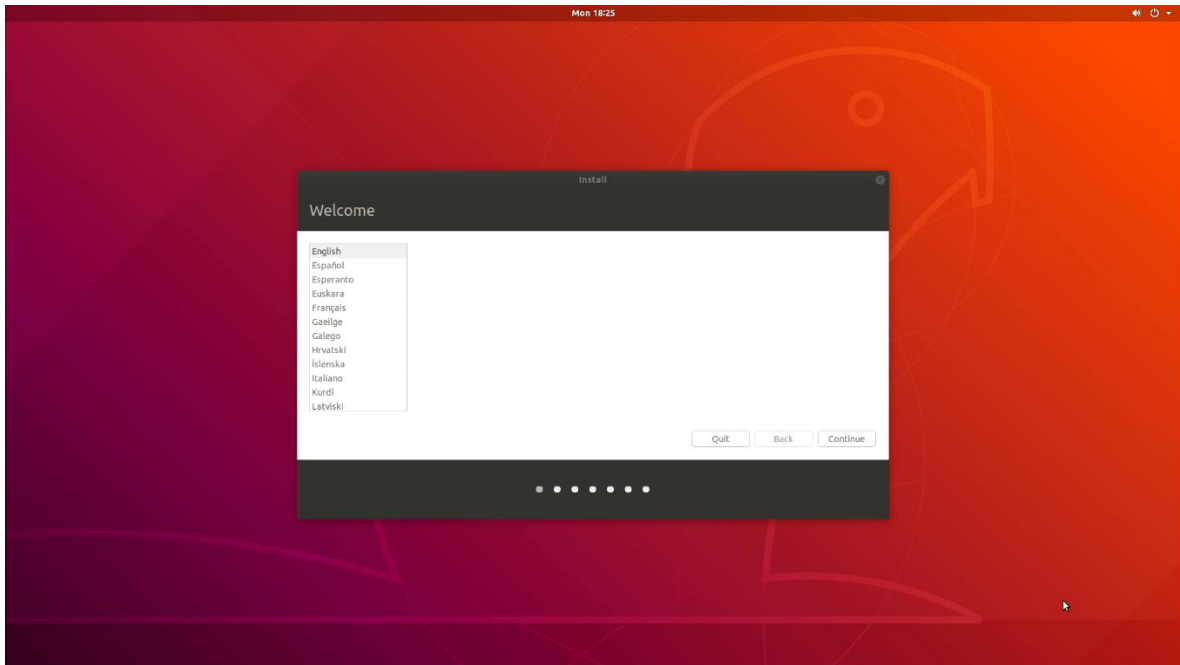# Section 2 – Installing Ubuntu 18.04 LTS

Please refer to the following instructions and screenshots on how to install Ubuntu 18.04 LTS on the ThinkStation P520c, P520, P720, and P920 workstations.

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

- Select the language to use during the installation process and "Continue".

- Select your keyboard layout and "Continue".
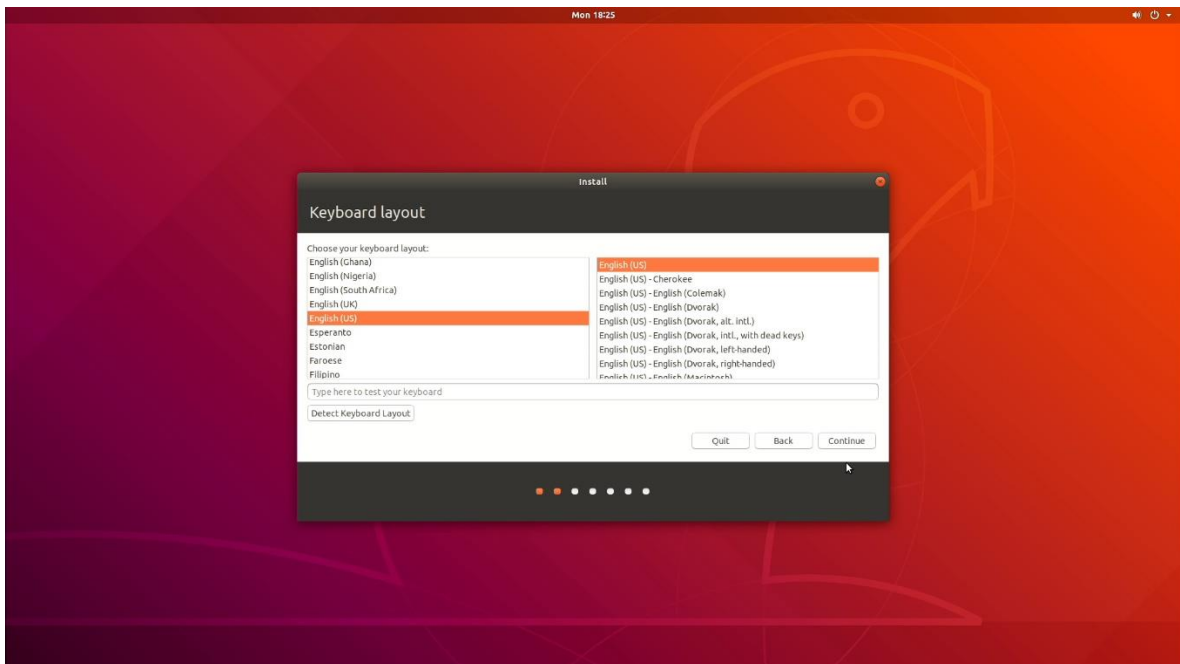
- Select "Normal Installation" and "Continue".
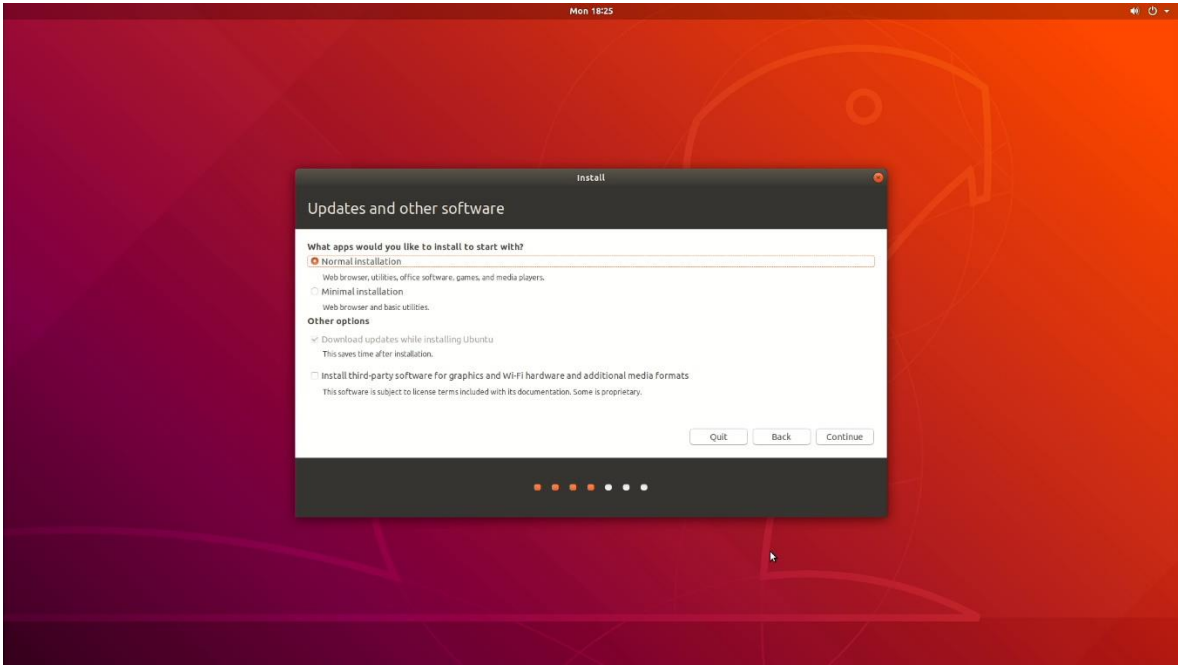
- Select "*Erase disk and install Ubuntu*" option and "Install Now".

- Select "Continue" to confirm making changes to the disk.

- Select your location from the map and "Continue".

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

- Installing Ubuntu.

- Installation Complete. Select "Restart Now".

- Ubuntu desktop screen.
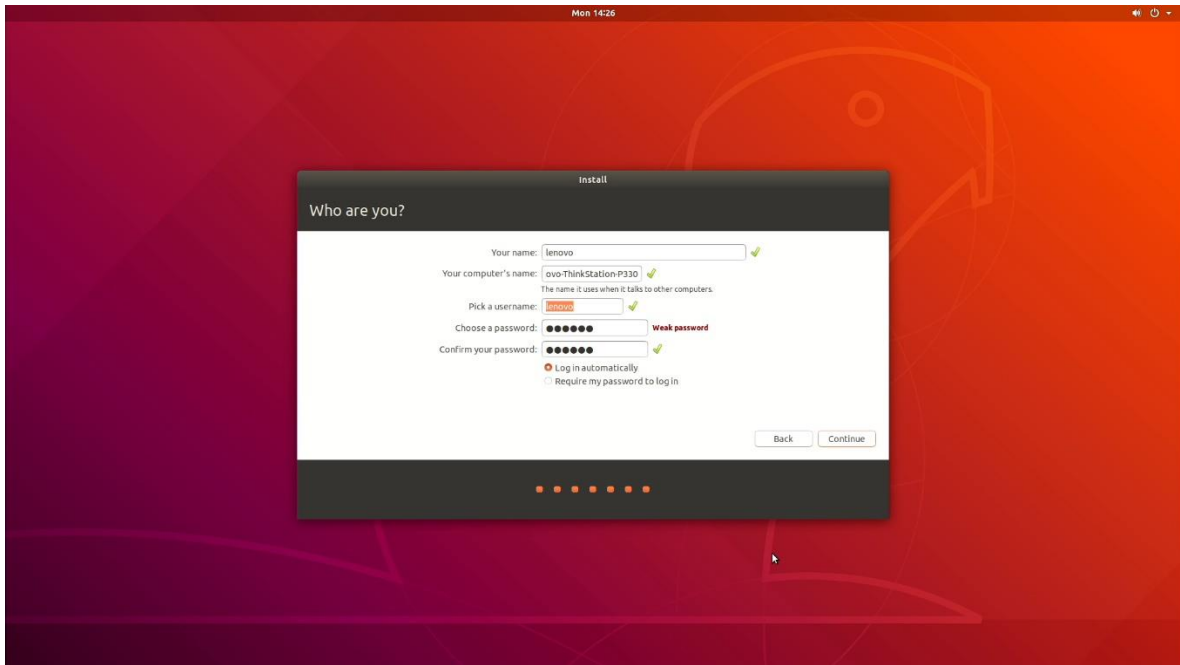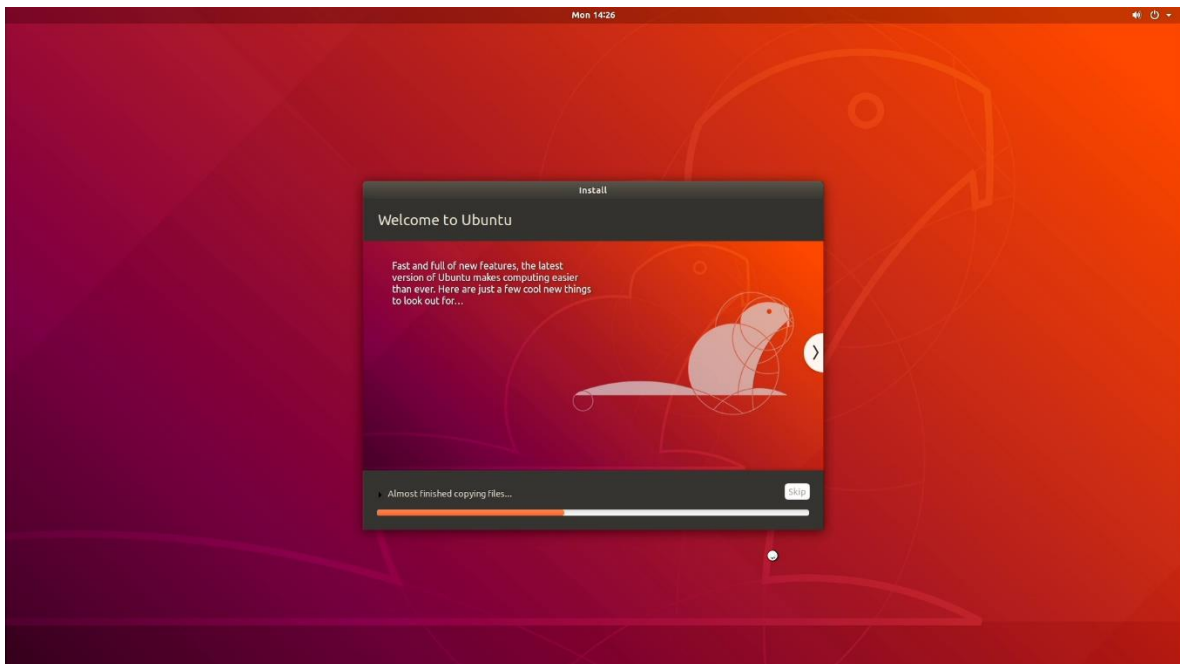
Section 3 – Installing the Nvidia Graphics Driver

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

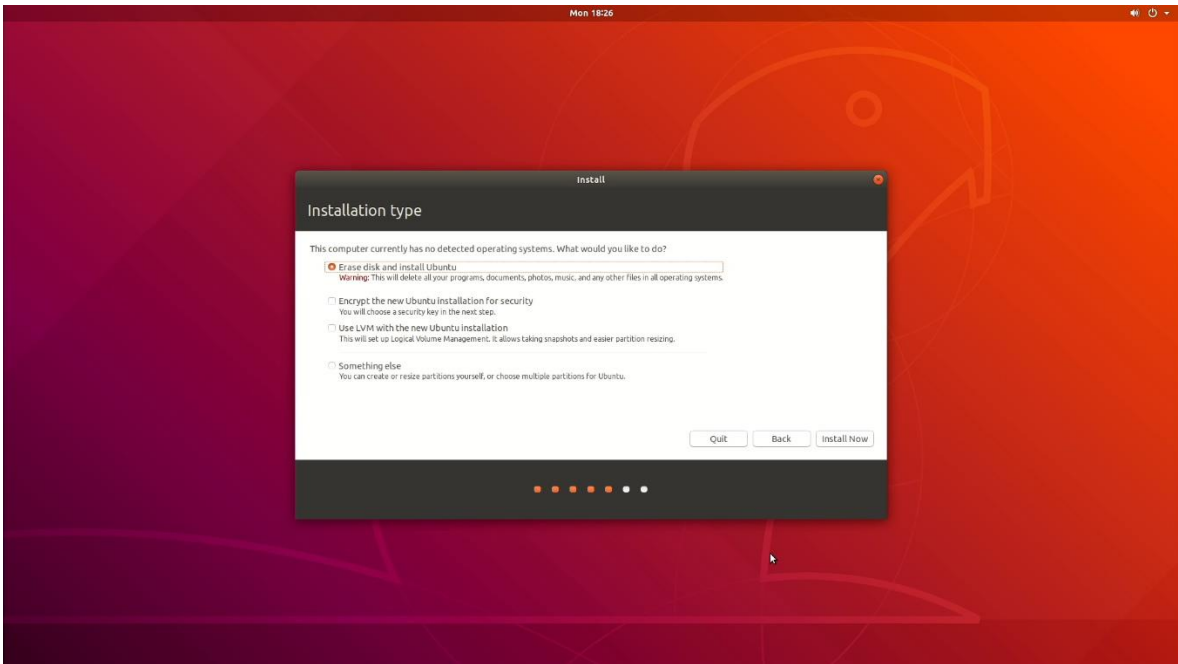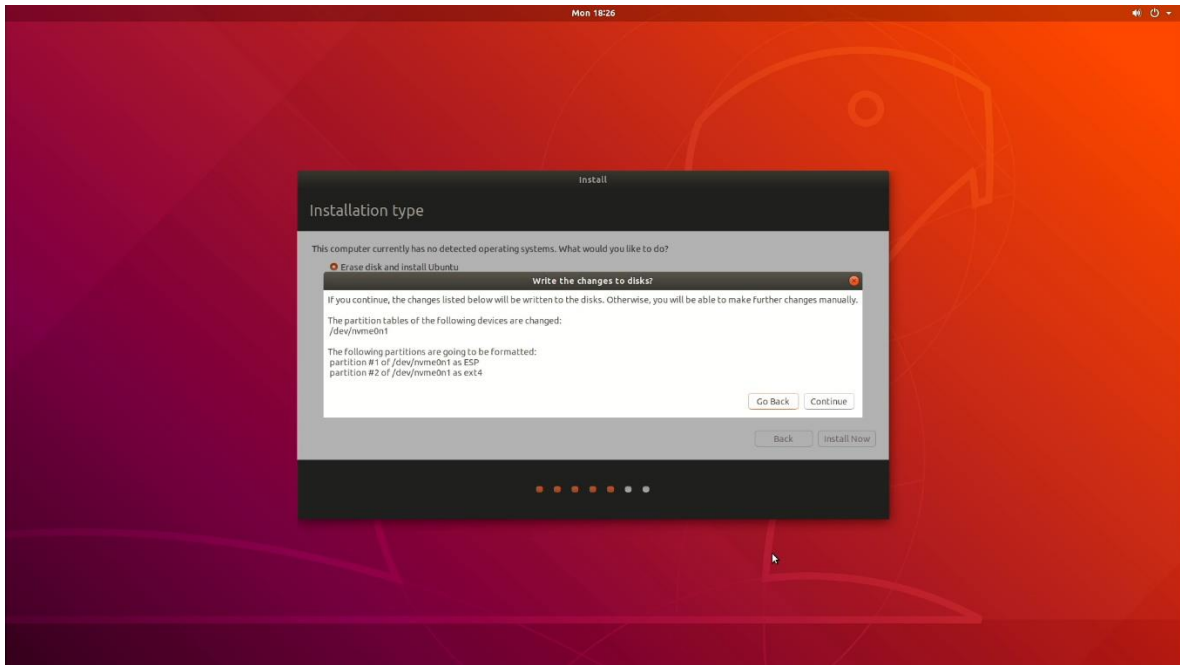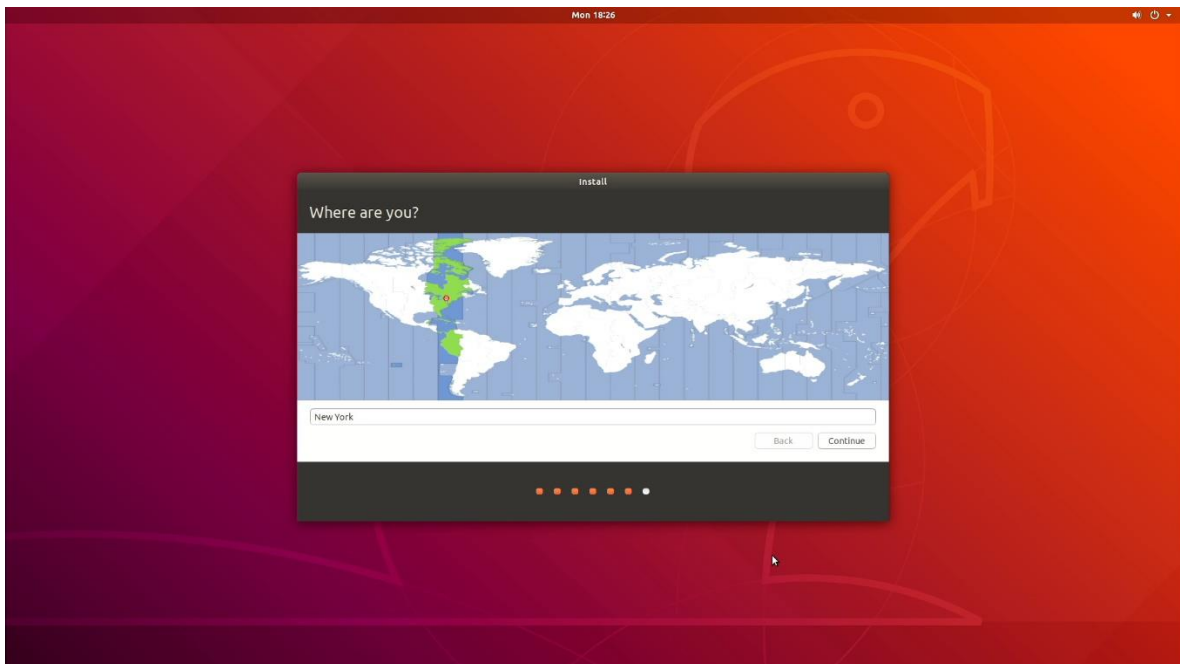To install the latest Nvidia graphics driver, follow the steps below:

- **Step 1**:

  o Download the Nvidia graphics driver from the Lenovo Support Website.
    https://download.lenovo.com/pccbbs/thinkcentre_drivers/1l3vdo204fxn.zip

- **Step 2:**

  o 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**:

  o During a system reboot, press the "ESC" button on the keyboard to enter the Ubuntu grub boot menu.
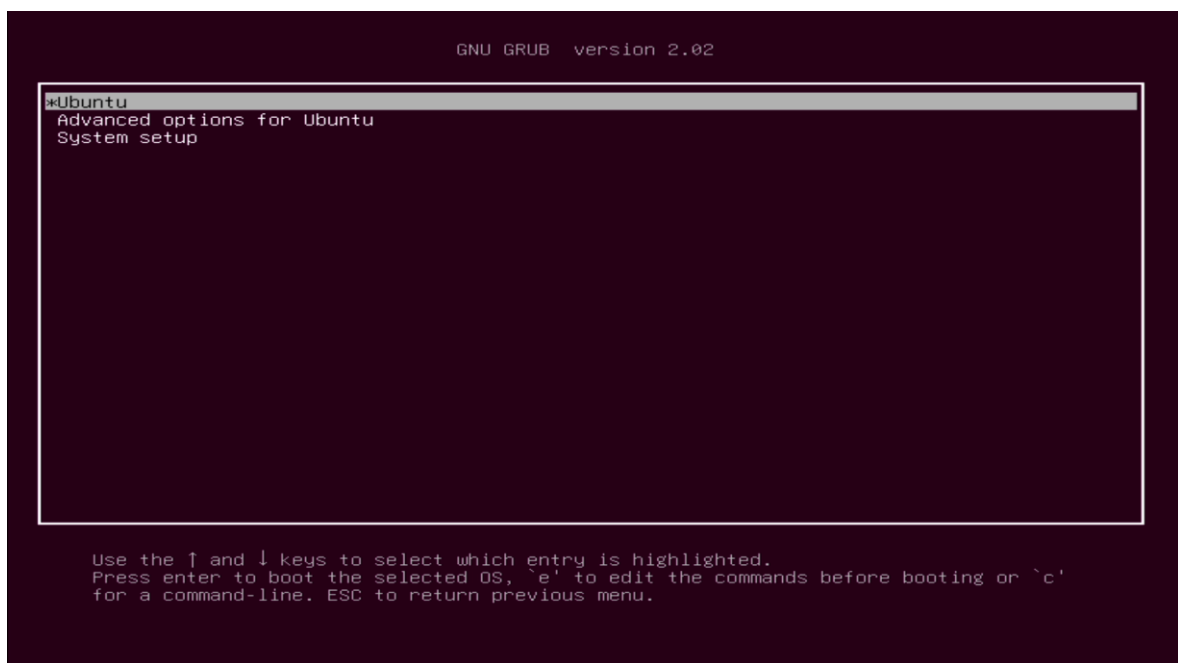
o Press 'e' to edit the kernel boot parameter and add "*nomodeset*" to the Linux boot command line.


```
                        GNU GRUB   version 2.02

setparams 'Ubuntu'

        recordfail
        load_video
        gfxmode $linux_gfx_mode
        insmod gzio
        if [ x$grub_platform = xxen ]; then insmod xzio; insmod lzopio; fi
        insmod part_gpt
        insmod ext2
        if [ x$feature_platform_search_hint = xy ]; then
          search --no-floppy --fs-uuid --set=root  50a94072-5b91-4e90-b3a5-0d7c65c48d34
        else
          search --no-floppy --fs-uuid --set=root 50a94072-5b91-4e90-b3a5-0d7c65c48d34
        fi
        linux        /boot/vmlinuz-5.0.0-25-generic root=UUID=50a94072-5b91-4e90-b3a5-0d7c65\
c48d34 ro nomodeset_ quiet splash $vt_handoff
        initrd        /boot/initrd.img-5.0.0-25-generic




    Minimum Emacs-like screen editing is supported. TAB lists completions. Press Ctrl-x
    or F10 to boot, Ctrl-c or F2 for a command-line or ESC to discard edits and return
    to the GRUB menu.
```

o Press CTRL-X or F10 to boot the system.

- **Step 4**:

  o At the Ubuntu desktop screen, open a terminal window and stop X-windows by using the following command:

  # init 3

- **Step 5**:

  - Log in as superuser using the credentials created above.

```
Ubuntu 18.04.2 LTS lenovo-ThinkStation-P330 tty1

lenovo-ThinkStation-P330 login: lenovo
Password:
Last login: Fri Aug 16 10:10:12 EDT 2019 on tty1
Welcome to Ubuntu 18.04.2 LTS (GNU/Linux 5.0.0-25-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

479 packages can be updated.
234 updates are security updates.

Your Hardware Enablement Stack (HWE) is supported until April 2023.
lenovo@lenovo-ThinkStation-P330:~$ sudo su
[sudo] password for lenovo:
root@lenovo-ThinkStation-P330:/home/lenovo# _
```

- **Step 6**:

  - Connect the system to the internet and install the "Development Tools" libraries.

   # sudo apt-get update

    # sudo apt-get install build-essential

```
root@lenovo-ThinkStation-P330:/home/lenovo/Desktop/L3VD06ZWS14# apt-get update
Get:1 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Hit:2 http://us.archive.ubuntu.com/ubuntu bionic InRelease
Get:3 http://us.archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:5 http://security.ubuntu.com/ubuntu bionic-security/main amd64 DEP-11 Metadata [22.7 kB]
Get:6 http://security.ubuntu.com/ubuntu bionic-security/main DEP-11 64x64 Icons [31.7 kB]
Get:7 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [589 kB]
Get:8 http://us.archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [709 kB]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/universe i386 Packages [579 kB]
Get:10 http://security.ubuntu.com/ubuntu bionic-security/universe Translation-en [195 kB]
Get:11 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 DEP-11 Metadata [42.0 kB]
Get:12 http://security.ubuntu.com/ubuntu bionic-security/universe DEP-11 48x48 Icons [16.4 kB]
Get:13 http://security.ubuntu.com/ubuntu bionic-security/universe DEP-11 64x64 Icons [111 kB]
Get:14 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 DEP-11 Metadata [2,464 B]
Get:15 http://us.archive.ubuntu.com/ubuntu bionic-updates/main i386 Packages [571 kB]
Get:16 http://us.archive.ubuntu.com/ubuntu bionic-updates/main amd64 DEP-11 Metadata [282 kB]
Get:17 http://us.archive.ubuntu.com/ubuntu bionic-updates/main DEP-11 48x48 Icons [66.6 kB]
Get:18 http://us.archive.ubuntu.com/ubuntu bionic-updates/main DEP-11 64x64 Icons [124 kB]
Get:19 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe i386 Packages [974 kB]
Get:20 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [997 kB]
Get:21 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe Translation-en [305 kB]
Get:22 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 DEP-11 Metadata [252 kB]
Get:23 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe DEP-11 48x48 Icons [207 kB]
Get:24 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe DEP-11 64x64 Icons [448 kB]
Get:25 http://us.archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 DEP-11 Metadata [2,468 B]
Get:26 http://us.archive.ubuntu.com/ubuntu bionic-backports/universe amd64 Packages [4,000 B]
Get:27 http://us.archive.ubuntu.com/ubuntu bionic-backports/universe i386 Packages [4,008 B]
Get:28 http://us.archive.ubuntu.com/ubuntu bionic-backports/universe Translation-en [1,856 B]
Get:29 http://us.archive.ubuntu.com/ubuntu bionic-backports/universe amd64 DEP-11 Metadata [7,712 B]
Fetched 6,797 kB in 1s (4,625 kB/s)
Reading package lists... Done
root@lenovo-ThinkStation-P330:/home/lenovo/Desktop/L3VD06ZWS14# apt-get install build-essential_
```

- **Step 7**:

  - o Browse to the directory location to where the Nvidia driver was downloaded and run the following commands to unzip and install the driver.
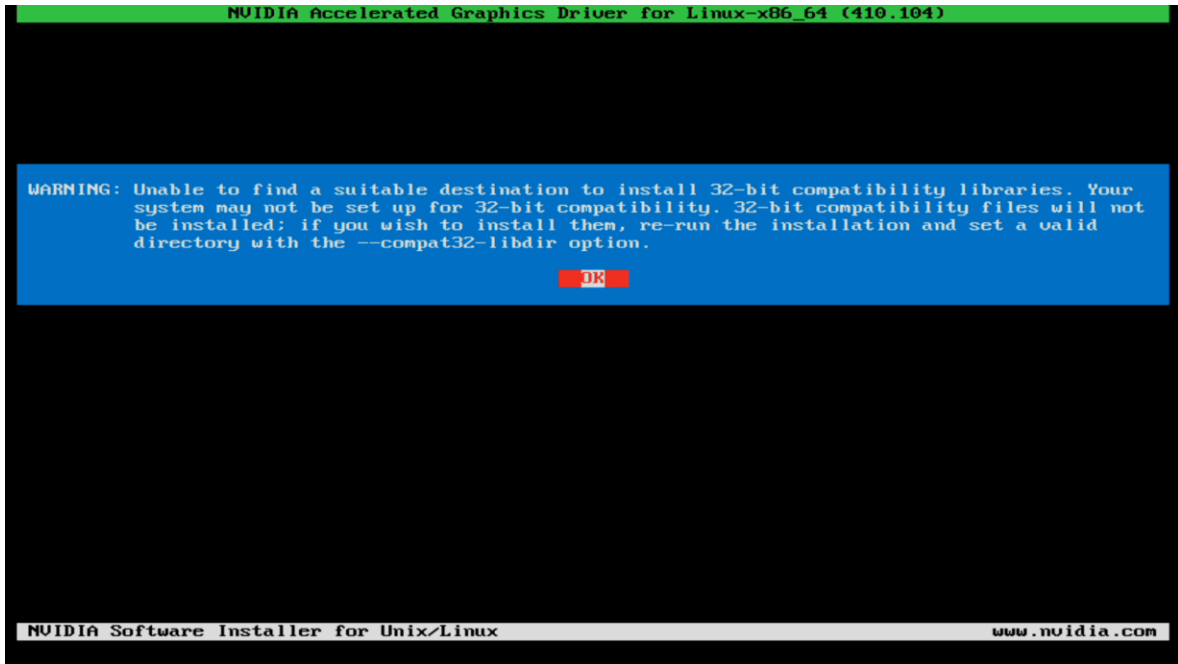
    # sudo unzip 1l3vdo204fxn.zip

    # sudo sh NVIDIA-Linux-x86_64-410.104.run

- **Step 8**:

  - o Select "Continue Installation" at the pre-install script failed message.
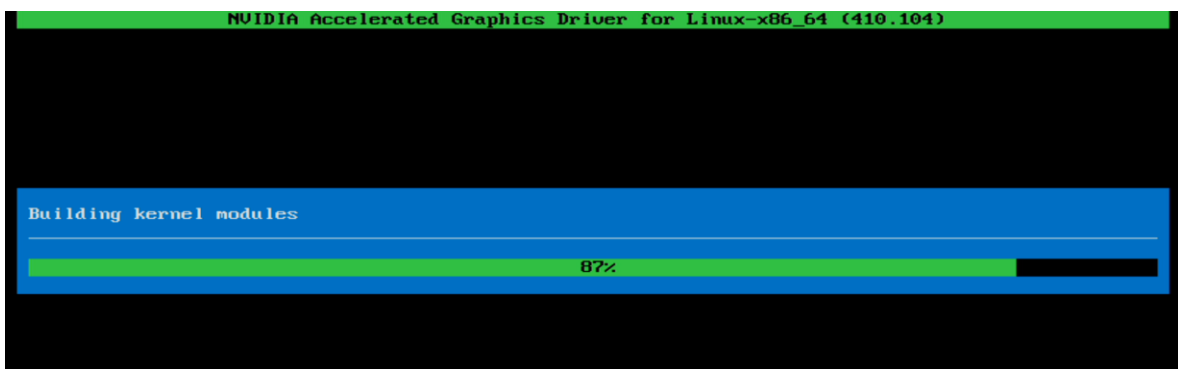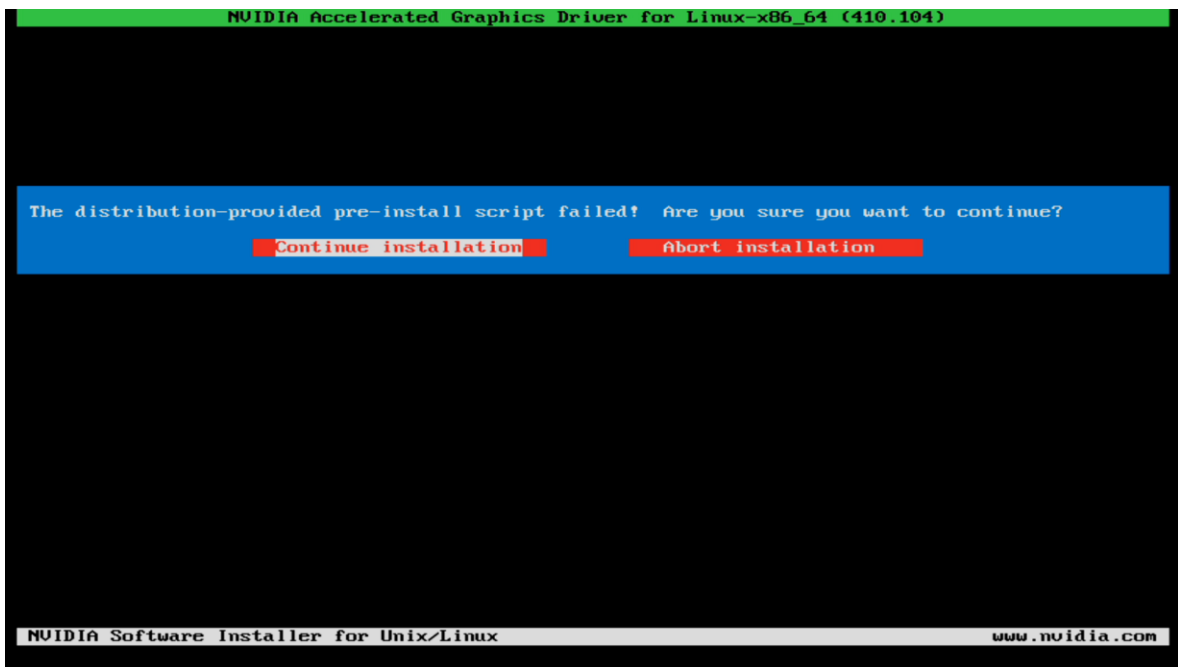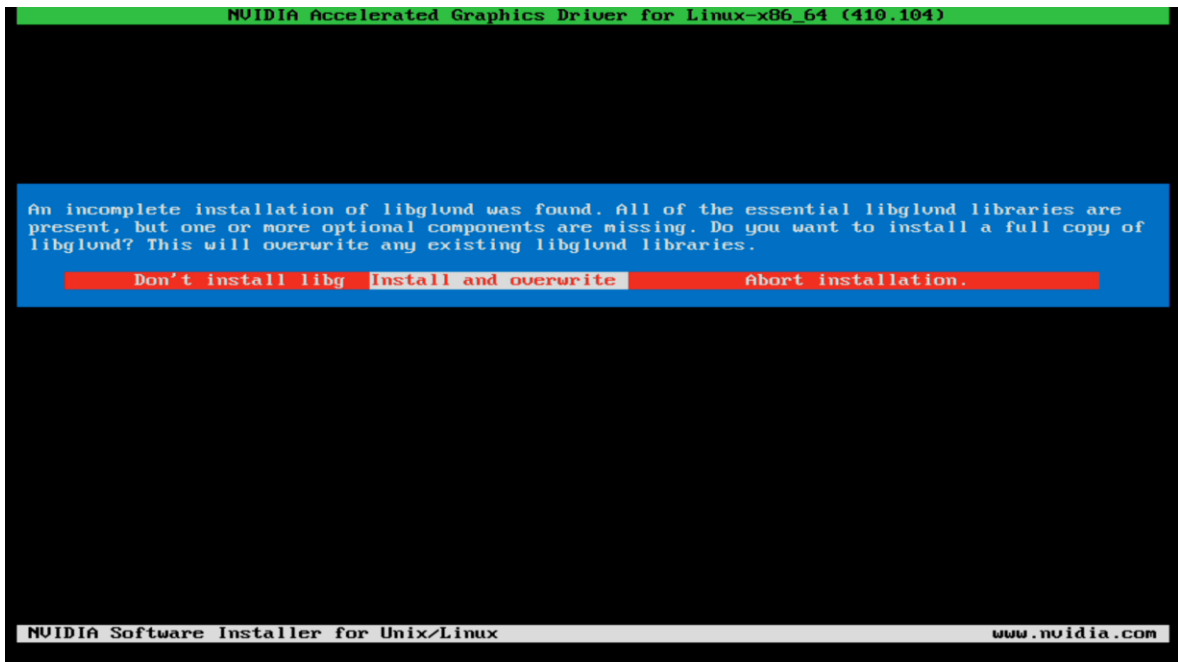
- **Step 9**:

  - o Select "OK" at the warning message where the installer couldn't find 32-bit compatible libraries.
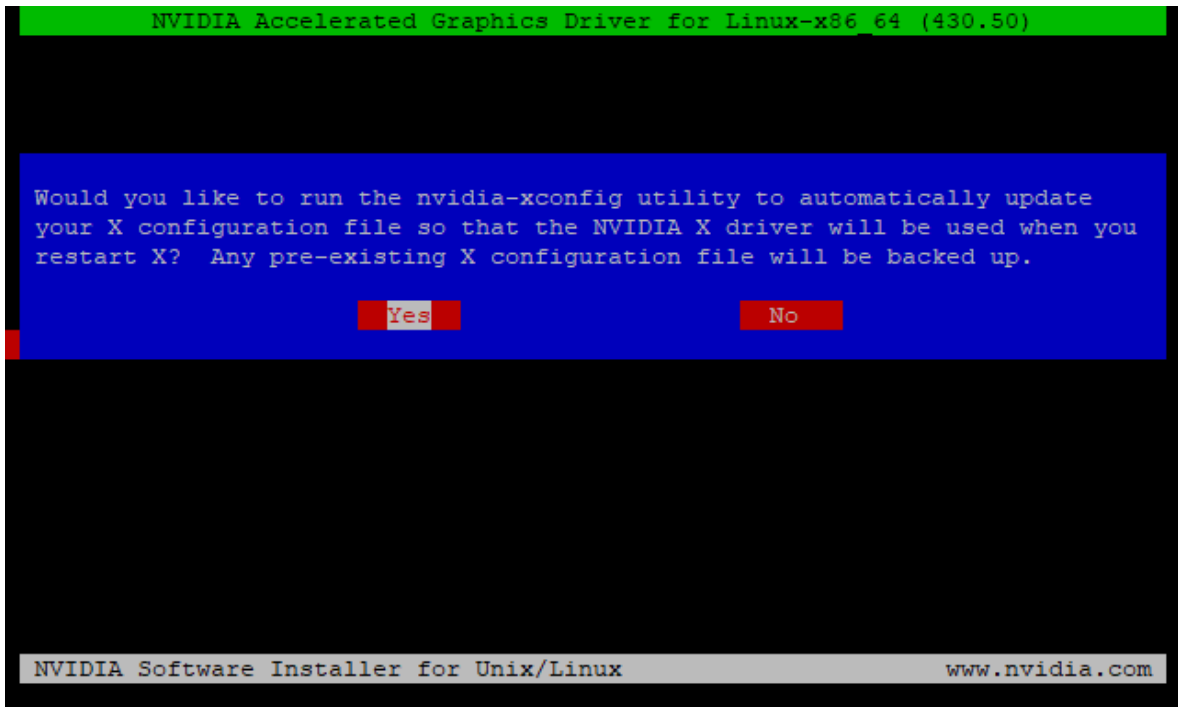

- **Step 10**:

  - o Select "Install and overwrite" for the libglvnd libraries.
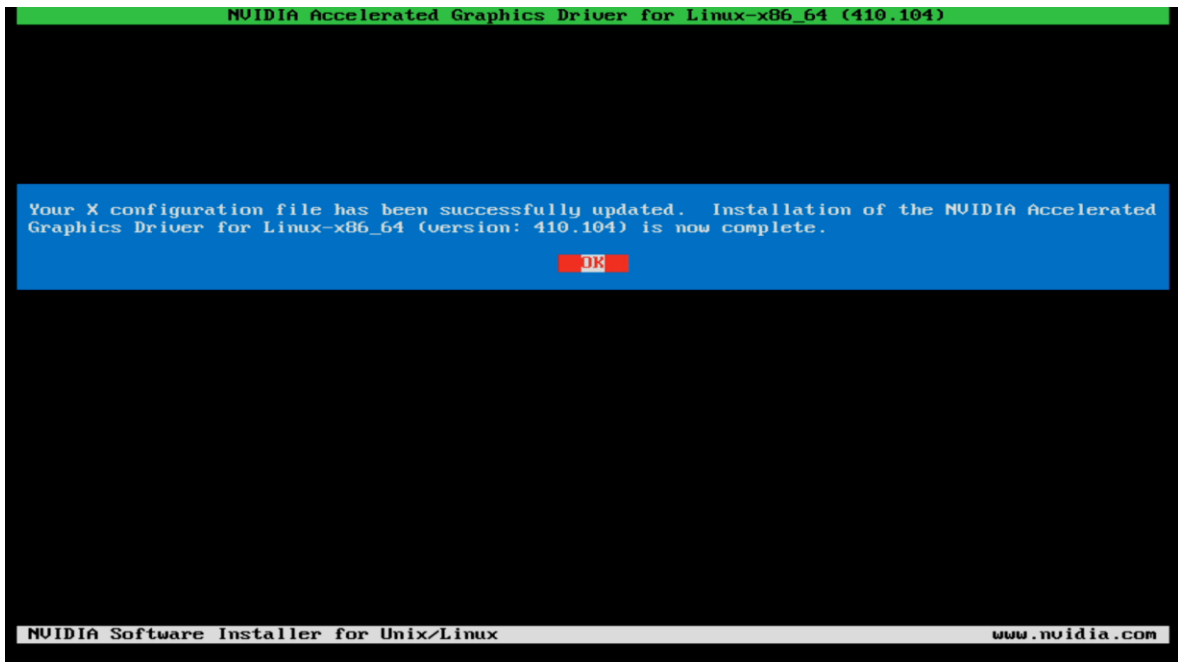
- **Step 11**:

  - Select "Yes" to update the X-configuration file to use the Nvidia X-driver.

- **Step 12**:

  - Select "OK" at the completion of the driver installation process.

- **Step 13**:

  - o Verify the Nvidia driver has been installed successfully and is loaded properly by running the following command:

    # nvidia-smi

```
root@lenovo-ThinkStation-P330:/home/lenovo/Desktop/L3VDO62WS14# nvidia-smi
Fri Aug 16 10:15:26 2019
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 410.104      Driver Version: 410.104        CUDA Version: 10.0    |
|-------------------------------+----------------------+----------------------+
| 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 P620          Off | 00000000:01:00.0 Off |                  N/A |
| 43%   49C    P0    N/A /  N/A |      0MiB /  1997MiB |      2%      Default |
+-------------------------------+----------------------+----------------------+

+-----------------------------------------------------------------------------+
| Processes:                                                       GPU Memory |
|  GPU       PID    Type    Process name                           Usage      |
|=============================================================================|
|  No running processes found                                                 |
+-----------------------------------------------------------------------------+
root@lenovo-ThinkStation-P330:/home/lenovo/Desktop/L3VDO62WS14#
```

- **Step 13**:

  - o Reboot the system.

Section 4 – Installing the Network Wireless Driver

The wireless network device offered for the P520c, P520, P720, and P920 is native to Ubuntu 18.04 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 18.04 LTS; therefore, you will not need to install any additional drivers separately.

Section 6 – Revision History

Version	Date	Author	Changes/Updates
1.0	10/21/2019	Jason Moebs	Initial launch release