# Ubuntu Linux Setup Guide

For ThinkPad P1 Gen2

\*\*\* Official support of Ubuntu 18.04 LTS and later





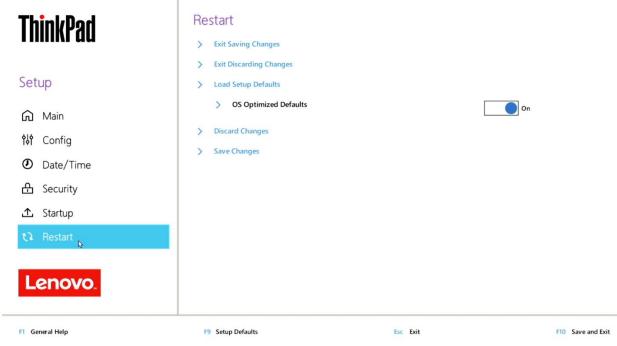
## Section 1 – BIOS Setup and Pre-Installation Steps

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.



• Select 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.

| Attention!  |  |
|---|--|
| If OS Optimized Defaults is changed to Disabled, the default<br>value of some security settings including Secure Boot, Secure<br>RollBack Prevention and Virtualization features are disabled.<br>Do you really want to continue?<br>Select Yes to continue to disable the OS Optimized Defaults.<br>Select No to discontinue the operation.<br><b>Yes</b> No |  |

• Select the "Startup" menu tab. 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   | Startup  | î                   |
|--|--|---------------------|
| Setup  | > Network Boot                                 | PXE BOOT            |
| 슈 Main<br>የ솪 Config  | UEFI/Legacy Boot     UEFI/Legacy Boot Priority | Both  VEFI First  V |
| <ul> <li>Date/Time</li> <li>Security</li> <li>Startup</li> </ul> | > Boot Mode                                    | Quick 🗸             |
| <ul><li>Restart</li></ul>  | > Boot device List F12 Option                  | On                  |
| Lenovo.  | > Boot Order Lock                              | off                 |
| F1 General Help  | F9 Setup Defaults Esc Exit                     | F10 Save and Exit   |

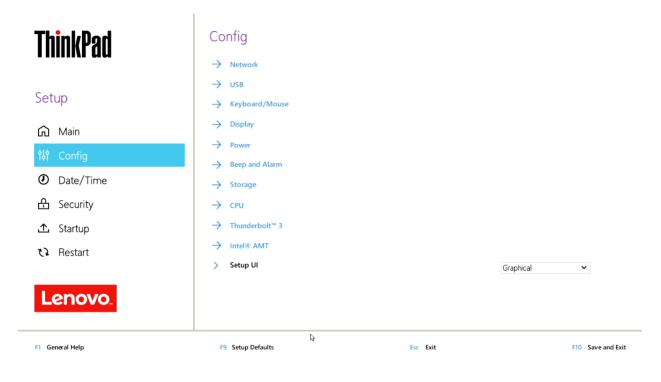
• Press function F10 key to save and exit BIOS setup.

| Setup Confirmation                       |
|--|
| Save configuration changes and exit now? |
| Yes No                                   |
|  |

## Section 2 – Discrete vs Hybrid Graphics

The Thinkpad P1 Gen2 offers 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.



• 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        | ← Config<br>Display   |          |  |
|-----------------|-----------------------|----------|--|
| Setup           | > Boot Display Device |          | ThinkPad LCD   |
|                 | > Graphics Device     |          | Discrete Graphics  |
| 🔂 Main          |                       |          | * Unselectable when Thunderbolt™ 3<br>Security Level is not DisplayPort and USB. |
| <b>않 Config</b> |                       |          |  |
| Date/Time       | > Boot Time Extension |          | Disabled 🗸   |
| 🔒 Security      |                       |          |  |
| 土 Startup       |                       | 4        |  |
| رع Restart      |                       |          |  |
| Lenovo.         |                       |          |  |
| F1 General Help | F9 Setup Defaults     | Esc Exit | F10 Save and Exit  |

## Section 3 – Installing Ubuntu Linux 18.04 LTS

Please refer to the following instructions and screenshots on how to install Ubuntu 18.04 LTS on the Lenovo Thinkpad P1 Gen2.

- Insert the Ubuntu 18.04 LTS 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.

| ThinkPad             | Boot Menu<br>ubuntu<br>Red Hat Enterprise Linux<br>NVMe0: SAMSUNG MZVLB512HBJQ-000L7<br>USB HDD: ADATA USB Flash Drive<br>> PXE BOOT |          |
|----------------------|--|----------|
| ▲ Boot Menu          | > PXE BOOT<br>LENOVO CLOUD: Intel(R) Gigabit 0.0.19-IPv4   |          |
| <b>የ</b> ያየ App Menu |  |          |
|                      | d/Collapse Tab Switch Menu Enter Select E  | Esc Exit |

• Highlight Install Ubuntu from the GRUB boot menu and hit enter.

| Try Ubuntu without installing<br>Winstall Ubuntu<br>DEM install (for manufacturers) |  |
|---|--|
| Check disc for defects  |  |
|   |  |
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| lise the I and I keus to select which entry is highlighted.                         |  |
| Press enter to boot the selected OS, 'e' to edit the commands be                    |  |

• The Ubuntu Linux Welcome Screen should appear. Select the appropriate language and "Continue".

|   |  | Thu 18:25 |                    | 40 e - |
|---|--|-----------|--------------------|--------|
|   |  |           |                    |        |
| M   | /elcome  |           | •                  |        |
| ES<br>ES<br>Fr<br>G<br>G<br>G<br>H<br>Is<br>Its<br>Its<br>Its | nglish<br>iperanto<br>skara<br>ançais<br>seilge<br>alego<br>vatski<br>lenska<br>aliano<br>urdī<br>titviski | ţ,        |                    |        |
|   |  |           | Quit Back Continue |        |
|   |  | •••••     |                    |        |
|   |  |           |                    |        |

• Choose the keyboard layout and language accordingly by selecting each one.

| Thu 18:26  |  | 40 🕢 🕶 |
|--|--|--------|
| Install  |  |        |
| Keyboard layout  |  |        |
| Choose your keyboard layout:<br>English (Chana)<br>English (Nigeria)<br>English (VS) - Cherokee<br>English (US) - English (US) - Engli | sk)<br>sk, alt. intl.)<br>sk, intl., with dead keys)<br>sk, right-handed)<br>sk, right-handed) |        |
|  | Quit Back Continue   |        |
| ••••••   | *  |        |
|  |  |        |

• Select "Normal Installation" and "Continue".

| Thu 18:26   | 40 E 🕶 |
|---|--------|
| Install   |        |
| Updates and other software  |        |
| What apps would you like to install to start with?         Image: Start with the sta |        |
| Quit Back Continue  |        |
| •••••   |        |
|   |        |

• Choose the installation type. For simplicity, this guide was done using "Erase disk and install Ubuntu".

| install  |  |
|--|--|
| Installation type  |  |
| This computer currently has no detected operating systems. What would you like to do?         Verse disk and installation in the second system work, and any other files in all operating systems.         Encrypt the new Ubunt installation for security you will doose a work part of the sin all operating systems.         Use UV with the new Ubunt installation for security you will doose a subject installation for security.         Use UV with the new Ubunt installation for security the with the new Ubunt installation.         This will st up topical Volume Kanagement. It allows taking supplies and easier partition resides.         Something else         You can create or resize partitions yourself, or choose multiple partitions for tbunus.         Quit       Back       Imstyll Now |  |
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• Select "Continue" to confirm changes will be made to the disk.

| Installation type  |  |
|--|--|
| This computer currently has no detected operating systems. What would you like to do? Write the changes it of disks? If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually. WARNING: This will destroy all date on any partitions you have removed as well as on the partitions that are going to be formatted. The dolowing devices of the following devices are changed: /dev/immeOnt The following devices as ISP. |  |
| partition #2 of /dev/nomeOnt as ext4  Co Back Cipetinue  Back install Now  |  |
|  |  |
|  |  |

• Choose the appropriate geographical location and select "Continue".



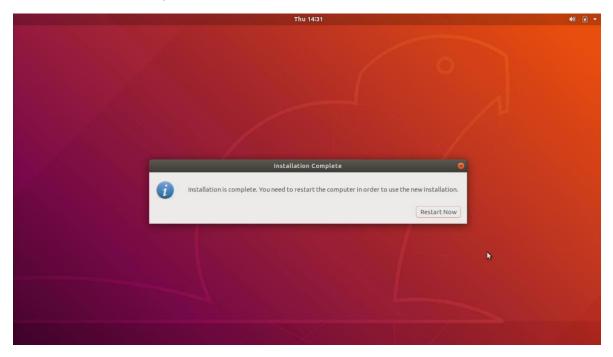
• Fill out the appropriate input boxes and select "Continue".

|                        | Wed 14:12   |                     | 40) 🗿 🔫       |
|------------------------|---|---------------------|---------------|
|                        | Install   |                     |               |
|                        | Inscall   |                     |               |
| Who are you?           |   |                     |               |
|                        |   |                     |               |
| Your name:             | lenovo  |                     |               |
|                        | ovo-ThinkPad-P1-Gen2  |                     |               |
|                        | The name it uses when it talks  | to other computers. |               |
| Pick a username:       |   | 7                   |               |
| Choose a password:     |   | Weak password       |               |
| Confirm your password: |   |                     |               |
|                        | <ul> <li>Log in automatically</li> <li>Require my password</li> </ul> | to log in           |               |
|                        |   |                     |               |
|                        |   |                     |               |
|                        |   |                     | Back Continue |
|                        |   |                     |               |
|                        |   | -                   |               |
|                        |   |                     |               |
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|                        |   |                     |               |
|                        |   |                     |               |

• Ubuntu installation progress bar will be shown.



• Once the installation completes, select "Restart Now".



• Remove the installation media and hit enter.



• Ubuntu Desktop Screen.



### Section 4 – Wireless Network Driver

The wireless network driver isn't native to the Ubuntu Linux 18.04 kernel. Therefore, the wireless device will not work following the Ubuntu 18.04 LTS installation by default. However, here are a couple of workarounds to get the wireless network working on the Thinkpad P1 Gen2.

#### Option 1:

- Type the following commands into a terminal window.
  - # sudo add-apt-repository ppa:canonical-hwe-team/pc-oem-dkms
  - # sudo apt update
  - # sudo apt install backport-iwlwifi-dkms
  - # sudo modprobe iwlwifi
  - # sudo reboot
- Download and extract the Linux driver for the Wireless Networking device from Intel's website.

# wget <u>https://wireless.wiki.kernel.org/ media/en/users/drivers/iwlwifi/iwlwifi-cc-46.3cfab8da.0.tgz</u>

- # tar zxf iwlwifi-cc-46.3cfab8da.0.tgz
- # cd iwlwifi-cc-46.3cfab8da.0.tgz
- # cp iwlwifi-cc-a0-46.ucode /lib/firmware/
- # cp LICENSE.iwlwifi-cc.ucode /lib/firmware/
- Load the driver module and reboot the system.
  - # modprobe iwlwifi
  - # reboot

#### Option 2:

- Upgrade to the Linux kernel 5.0 and linux-firmware to the latest version by using the following commands:

# sudo apt-get install linux-oem-osp1 linux-firmware

# sudo reboot

## Section 5 – 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.

There are a couple of different ways to install the Nvidia driver; through the Ubuntu upstream repository or by downloading the Nvidia driver from Nvidia's website and installing manually.

**Option 1**: Install the Nvidia graphics driver from the Ubuntu Repository.

1. Update Ubuntu after the completion of the installation process.

# sudo apt update

2. Add the Nvidia repository using the following command.

# sudo add-apt-repository ppa:graphics-drivers

- Update Ubuntu again to update the source list file.
   # sudo apt update
- 4. Install the Nvidia driver.

# sudo apt install nvidia-driver-430

5. Reboot the system.

# sudo reboot

**Option 2**: Install the Nvidia graphics driver manually.

- 1. Download the latest Nvidia graphics driver for the appropriate Nvidia GPU from nvidia.com/drivers.
- 2. Open a terminal window and stop x-windows by using the following command.

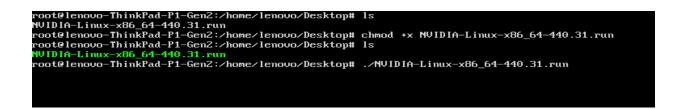
# sudo init 3

| root@lenovo-ThinkPad-P1-Gen2: /home/lenovo       | <b>e</b> • × |  |  |  |  |  |
|--|--------------|--|--|--|--|--|
| File Edit View Search Terminal Help              |              |  |  |  |  |  |
| oot@lenovo-ThinkPad-P1-Gen2:/home/lenovo# init 3 |              |  |  |  |  |  |
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|  |              |  |  |  |  |  |

3. Make the Nvidia installer an executable and run the executable by using the following commands.

# sudo chmod +x NVIDIA-Linux-x86-64-\*

# sudo ./NVIDIA-Linux-x86\_64\*



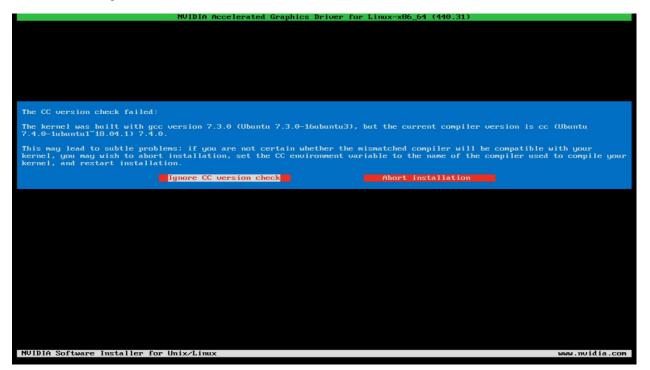
4. Select "Continue Installation".



5. Select "OK".

|           | NVIDIA Accelerated Graphics Driver for Linux-x86_64 (440.31)  |
|-----------|---|
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| WARNING:  | Ignoring CC version mismatch:   |
|           | Ignoring CC version mismatch:<br>The kernel was built with gcc version 7.3.0 (Ubuntu 7.3.0-16ubuntu3), but the current compiler version is cc<br>(Ubuntu 7.4.0-1ubuntu1~18.04.1) 7.4.0. |
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| NUIDIA S  |   |
| HOIDTH 20 | oftware Installer for Unix/Linux www.nvidia.com   |

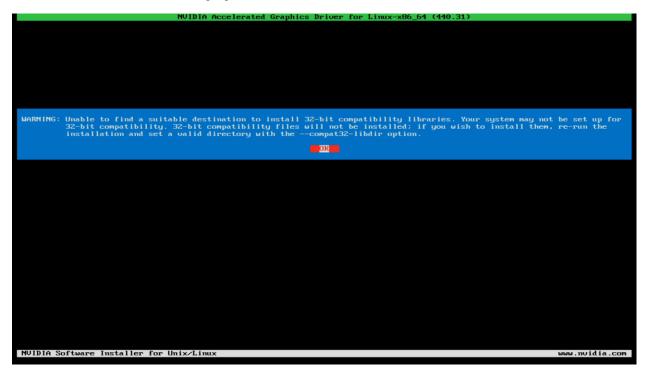
6. Select "Ignore CC version check".



7. Let the system build kernel modules.

|                                 | NVIDIA Accelerated Graphics Driver for Linux-x86_64 (440.31) |                |
|---------------------------------|--|----------------|
|                                 |  |                |
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| Building kernel modules         |  |                |
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| NVIDIA Software Installer for L | Jnix/Linux   | www.nvidia.com |

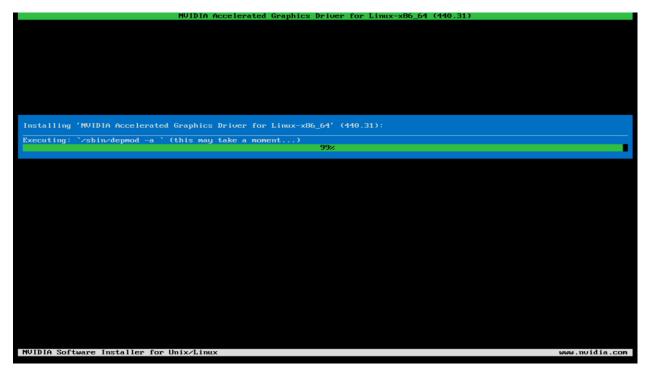
8. Select OK for the warning again.



9. Select "Install and overwrite existing files" and hit enter.



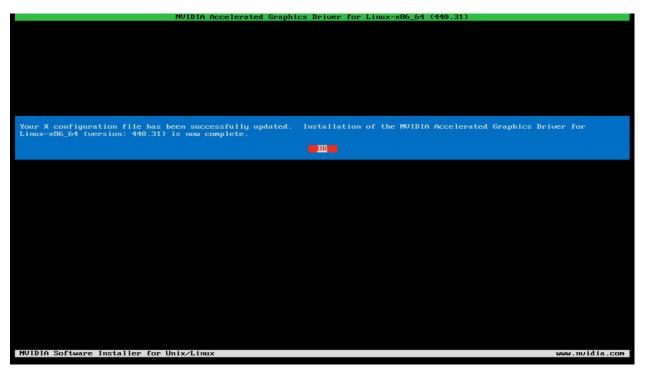
10. Nvidia driver installing progress bar may appear.



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

| NVIDIA Accelerated Graphics Driver for Linux-x86_64 (440.31)  |                |
|---|----------------|
|   |                |
|   |                |
|   |                |
|   |                |
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|   |                |
| Would you like to run the nuidia-xconfig utility to automatically update your X configuration file so that t driver will be used when you restart X? Any pre-existing X configuration file will be backed up. | he NVIDIA X    |
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|   |                |
| NVIDIA Software Installer for Unix/Linux  | www.nvidia.com |

#### 12. Select "OK".



13. Execute the following command to verify the Nvidia driver is loaded.

| NVID |              |        |                    |                    |         |               | 31                  |              |                    |                            |            |
|------|--------------|--------|--------------------|--------------------|---------|---------------|---------------------|--------------|--------------------|----------------------------|------------|
| Fan  | Name<br>Temp | Perf   | Persist<br>Pwr:Usa | ence-MI<br>ge/CapI |         | Memo          | Disp.A<br>ry-Usage  | i Vo<br>I GE | olatile<br>PU-Util | Uncorr.<br>Compute         | ECC<br>M.  |
| 0    | Quadro       | D T100 | 0                  | Off I              | 0000000 | 0:01:<br>iB / | 0.00 0ff<br>3908MiB |              | 0%                 |                            | N∕A<br>ult |
| GPU  |              |        | Туре<br>=======    |                    |         |               |                     |              |                    | GPU Mem<br>Usage<br>====== |            |

14. Reboot the system.

# Section 6 – Revision History

| Version | Date      | Author       | Changes/Updates        |
|---------|-----------|--------------|------------------------|
|         |           |              |                        |
| 1.0     | 12/3/2019 | Sayali Pawar | Initial launch release |