#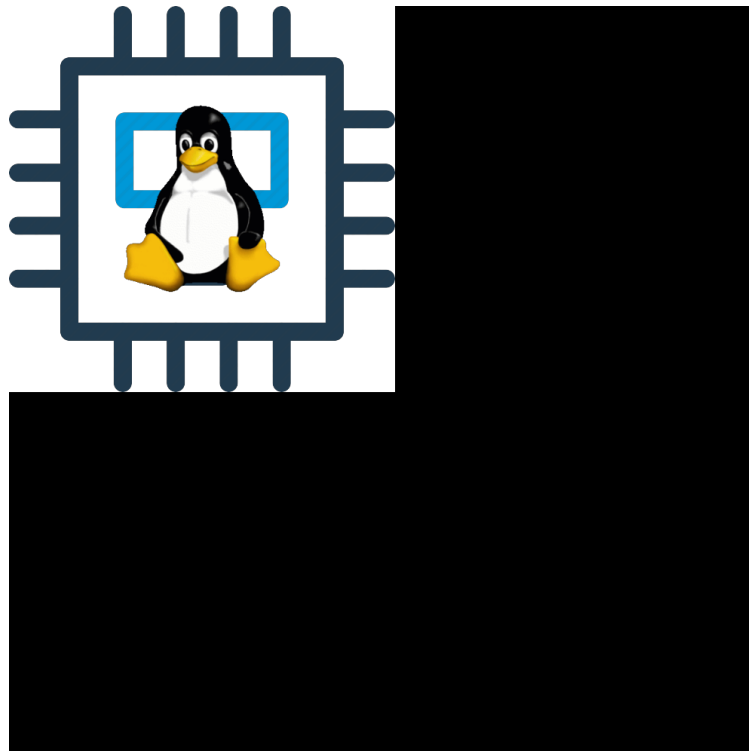 Getting Console and Graphical hardware system information on Linux with cpuinfo, neofetch, CPU-X (CPU-Z Unix alternative), I-nex and inxi

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   Earlier I've wrote extensive article on how to get hardware information on Linux using tools such as [dmidecode, hardinfo, lshw, hwinfo, x86info and biosdecode](#) but there are few other hardware reporting tools for Linux worthy to mention that has been there for historical reasons such as cpuinfo as we as some new shiny ones such as **neofetch** (a terminal / console hardware report tool as well the **CPU-X** and **I-Nex** which is Linux equivalent to the all known almost standard for Windows hardware detection **CPU-Z** worthy to say few words about.

1. cpuinfo

   Perhaps the most basic tool to give you a brief information about your Processor type (model) number of Cores and Logical Processors is **cpuinfo**

   I remember **cpuinfo** has been there since the very beginning on almost all Linux distributions's repository, nowadays its popularity of the days when the kings on the Linux OS server scenes were **Slackware, Caldera OpenLinux** and **Redhat 6.0 Linux and Debian 3.0** declined but still for scripting purposes it is handy small proggie.

   To install and run it in Debian / Ubuntu / Mint Linux etc.:

     aptitude install -y cpuinfo
    ...
    /usr/bin/cpu-info

2. neofetch

  The next one worthy to install and check is neofetch (a cross-platform and easy-to-use system information
 command line script that collects your Linux system information and display it on the terminal next to an image, it could be your distributions logo or any ascii art of your choice.)

  The cool thing about neofetch is besides being able to identify the System server / desktop hardware parameters, it gives some basic info about number of packages installed on the system, memory free and in use, used kernel and exact type of System (be it Dell PowerEdge Model XX, IBM eSeries Model / HP Proliant Model etc.

neofetch info generated on my home used **Lenovo Thikpad T420**

neofetch *info from pc-freak.net running current machine*

   neofetch *even supports Mac OS X and Windows OS ! :)*

To install **neofetch** on *Mac OS X:*

```
/usr/bin/ruby -e "$(curl -fsSL
https://raw.githubusercontent.com/Homebrew/install/master/install)"
```

or via Mac ported packages using **brew**

```
brew install neofetch
```


neofetch is even installable **on Windows OS that has the** scoop command line installer tool installer manager **with below PowerShell** code in **cmd.exe** (Command line)**:**

```
powershell Set-ExecutionPolicy RemoteSigned -scope CurrentUser
iex (new-object net.webclient).downloadstring('https://get.scoop.sh')
scoop install git
scoop install neofetch
```

```
                      ..,                3DESKTOP-VOVU527
              ....,,:;+ccllll           --------------------
       ...,,+:;  cllllllllllllllllll    OS: Windows 10 Pro x86_64
,ccllllllllllll  llllllllllllllllllll   Host: innotek GmbH VirtualBox
llllllllllllll   llllllllllllllllllll   Kernel: 2.10.0(0.325/5/3)
llllllllllllll   llllllllllllllllllll   Uptime: 4 hours, 18 mins
llllllllllllll   llllllllllllllllllll   Shell: bash 4.4.19
llllllllllllll   llllllllllllllllllll   Resolution: 1564x864
llllllllllllll   llllllllllllllllllll   DE: Aero
                                        WM: Explorer
llllllllllllll   llllllllllllllllllll   WM Theme: Aero
llllllllllllll   llllllllllllllllllll   CPU: Intel i7-2600K (3) @ 3.411GHz
llllllllllllll   llllllllllllllllllll   GPU: VirtualBox Graphics Adapter for Windows 8+
llllllllllllll   llllllllllllllllllll   Memory: 2554MiB / 4095MiB
llllllllllllll   llllllllllllllllllll
`'ccllllllllll   llllllllllllllllllll
   `' \*::  :cclllllllllllllll
              ````''*::cll
                      ..
```

By the way **Scoop was quite a finding for me and it is pretty handy to install plenty of useful command line Linux / UNIX tools,** such as **curl, wget, git etc.** in the same easy straight forward way as a standard **yum** or **apt-get** on **Windows** (without explicitly installing things as **GnuWin** and **CygWin**)**.**

## 3. CPU-X graphical user interface hardware report Linux GUI alternative to Windows CPU-Z

The packages for **CPU-X** are a bit outdated and even though there are rpm packages for Fedora, OpenSuSE and .deb package for Debian for Debian, Ubuntu and ArchLinux (**pacman**), there is no up to date version for **Debian 10** and the package builds distributed for different Linux distros are a bit outdated.

Thus to install **CPU-X** on any Linux distribution it is perhaps best to use the **portable version** (static binary) of **CPU-X**.
It is currently available on ***https://github.com/X0rg/CPU-X/releases***

**To install latest portable version of CPU-X**

> *wget* **https://github.com/X0rg/CPU-X/releases/download/v3.2.4/CPU-X_v3.2.4_portable.tar.gz**
> ...
> **mkdir CPU-X**

**cd CPU-X**
tar -zxvvf CPU-X_v3.2.4_portable.tar.gz
-rwxr-xr-x yohan/users 4563032 2019-01-13 22:15 **CPU-X_v3.2.4_portable.bsd64**
-rwxr-xr-x yohan/users 5484968 2019-01-13 22:15 **CPU-X_v3.2.4_portable.linux64**

**cp -rpf CPU-X_v3.2.4_portable.linux64 /usr/local/bin/**
**ln -sf /usr/local/bin/CPU-X_v3.2.4_portable.linux64 /usr/local/bin/cpu-x**

**Next run as superuser (root)**

hipo@jeremiah:~$ **su -c 'cpu-x'**

As seen from below screenshots cpu-x reports a lot of concrete specific hardware data on:

- Processor
- Motherboard
- Memory
- System
- Graphic card
- Performance

CPU-X (as superuser)

◀ CPU | Caches | Motherboard | Memory | System | Graphics | Bench ▶

**L1 Cache**
Size          2 x 32 KB, 8-way associative, 64-byte line size
Speed                        90223.30 MB/s

**L2 Cache**
Size          2 x 256 KB, 8-way associative, 64-byte line size
Speed                        45878.50 MB/s

**L3 Cache**
Size          4 MB, 16-way associative, 64-byte line size
Speed                        26611.00 MB/s

Test
# 0: Sequential 128-bit reads                               ▾

**CPU-X**          Version 3.2.4          OK

**L1 Cache**
Size          2 x 32 KB, 8-way associative, 64-byte line size
Speed                        90223.30 MB/s

| CPU-X (as superuser) | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |

◄ CPU | Caches | Motherboard | Memory | System | Graphics | Bench ►

**Motherboard**

| | |
| --- | --- |
| Manufacturer | LENOVO |
| Model | 4236VBJ |
| Revision | Not Available |

**BIOS**

| | |
| --- | --- |
| Brand | LENOVO |
| Version | 83ET70WW (1.40 ) |
| Date | 06/12/2012 |
| ROM Size | 128 kB / 8192 kB |

**Chipset**

| | |
| --- | --- |
| Vendor | Intel Corporation |
| Model | QM67 Express Chipset Family LPC Controller |

*CPU-X*        Version 3.2.4        OK

CPU-X (as superuser)

◄ CPU | Caches | Motherboard | Memory | System | Graphics | Bench ►

**L1 Cache**
Size      2 x 32 KB, 8-way associative, 64-byte line size
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**L3 Cache**
Size      4 MB, 16-way associative, 64-byte line size
Speed                    26611.00 MB/s

Test
# 0: Sequential 128-bit reads ▼

**CPU-X**          Version 3.2.4          OK

**L1 Cache**
Size      2 x 32 KB, 8-way associative, 64-byte line size
Speed                    90223.30 MB/s

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Size      2 x 256 KB, 8-way associative, 64-byte line size
Speed                    45878.50 MB/s

**L3 Cache**
Size      4 MB, 16-way associative, 64-byte line size
Speed                    26611.00 MB/s

Test

| CPU-X (as superuser) | | | | | |
|---|---|---|---|---|---|
| ◀ CPU | Caches | Motherboard | Memory | System | Graphics | Bench ▶ |

**Operating System**

| | |
|---|---|
| Kernel | Linux 4.19.0-5-amd64 |
| Distribution | Debian GNU/Linux 10 (buster) |
| Hostname | jeremiah |
| Uptime | 0 days, 5 hours, 18 minutes, 40 seconds |
| Compiler | cc (Debian 8.3.0-6) 8.3.0 |

**Memory**

| | | |
|---|---|---|
| Used | 4559 MB / 8049 MB | 56.64% |
| Buffers | 181 MB / 8049 MB | 2.25% |
| Cached | 3138 MB / 8049 MB | 38.99% |
| Free | 170 MB / 8049 MB | 2.11% |
| Swap | 28 MB / 8266 MB | 0.34% |

**CPU-X**          Version 3.2.4          OK

   **CPU-X** can be installed also on FreeBSD very easily by just installing from BSD port tree **sysutils/cpu-x/**
It is also said to work on other **\*BSDs**, **NetBSD**, **OpenBSD** Unixes but I guess this will require a manual compilation based on FreeBSD's port Makefile.

### 4. I-Nex another GUI alternative to CPU-Z for UNIX / Linux

   **I-Nex** is even more useful for general hardware reporting as it reports many **hardware specifications** not reported by **CPU-X** such as **Battery type and Model Name**  (if the hardware report is on a laptop), info on **USB** devices slots or plugged **USB devices brand and specifications**, the available Network devices on the system (MAC Addresses) of each of it, Installed and used drivers on Hard Disk (**ATA / SATA / SCSI / SSD**), HW Sector size, Logical Block size, HDD Sectors count and other specific Hard Drive data as well as information on available Audio (Sound Blaster) devices (**HDA-Intel**), used

Codecs, loaded **kernel ALSA driver**, Video card used and most importantly indicators on **Processor reported CPU (temperature)**.

### To install I-nex

Go to https://launchpad.net/i-nex or any of the mirror links where it resides and install the respective package, in my case, I was doing the installation on Debian Linux, so fetched current latest amd64 package which as of moment of writting this article is **i-nex_7.6.0-0-bzr977-20161012-ubuntu16.10.1_amd64.deb** , next installed it with **dpkg**

**dpkg -i i-nex_7.6.0-0-bzr977-20161012-ubuntu16.10.1_amd64.deb**

As the package was depending on some other .deb packages, which failed to install to install the missing ones I had to further run

**apt --fix-broken install**

hre

*I-Nex thermal indicators about CPU temperature on a Linux Desktop notebook*

I-Nex / Mobo (as superuser)

| CPU | GPU | Mobo | Audio | Drives | System |

**Board**

Board Vendor:  LENOVO

Board Version:  Not Available

Board Name:  4236VBJ

Board Asset Tag:  Not Available

**Bios**

Bios Vendor:  LENOVO

Bios Version:  83ET70WW (1.40 )

Bios Date:  06/12/2012

**Chassis**

Chassis Vendor:  LENOVO

Chassis Version:  Not Available

Chassis Type:  No Asset Information

Chassis Asset Tag:  4236VBJ

**Product**

Product Name:  4236VBJ

Product Version:  ThinkPad T420

7.6.0

Close

```
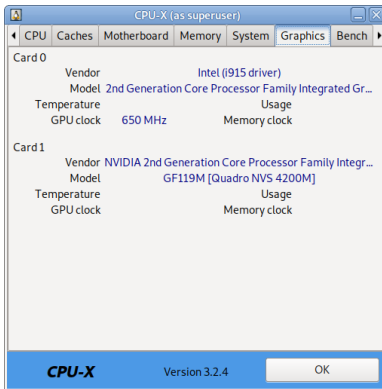I-Nex / Audio (as superuser)

CPU    GPU    Mobo    Audio    Drives    System

HDA-Intel - HDA Intel PCH          input10

Codec: Conexant CX20590            HDA Intel PCH Mic

ALSA Driver Version k4.19.0-5-amd64.

Codec: Conexant CX20590
Address: 0
AFG Function Id: 0x1 (unsol 1)
Vendor Id: 0x14f1506e
Subsystem Id: 0x17aa21ce
Revision Id: 0x100003
No Modem Function Group found
Default PCM:
    rates [0x160]: 44100 48000 96000
    bits [0xe]: 16 20 24
    formats [0x1]: PCM
Default Amp-In caps: N/A
Default Amp-Out caps: N/A
State of AFG node 0x01:
  Power states:  D0 D1 D2 D3 D3cold CLKSTOP EPSS
  Power: setting=D0, actual=D0
GPIO: io=4, o=0, i=0, unsolicited=1, wake=0
  IO[0]: enable=0, dir=0, wake=0, sticky=0, data=0, unsol=0
  IO[1]: enable=0, dir=0, wake=0, sticky=0, data=0, unsol=0
  IO[2]: enable=0, dir=0, wake=0, sticky=0, data=0, unsol=0
  IO[3]: enable=0, dir=0, wake=0, sticky=0, data=0, unsol=0
Node 0x10 [Audio Output] wcaps 0xc1d: Stereo Amp-Out R/L
  Control: name="Speaker Playback Volume", index=0, device=0
    ControlAmp: chs=3, dir=Out, idx=0, ofs=0
  Control: name="Speaker Playback Switch", index=0, device=0
    ControlAmp: chs=3, dir=Out, idx=0, ofs=0
  Device: name="CX20590 Analog", type="Audio", device=0

                      7.6.0                        Close
```

I-Nex / Drives (as superuser)

CPU | GPU | Mobo | Audio | Drives | System

180.0 GB	Vendor: ATA		Device rev: LF1i

Model: INTEL SSDSC2BW18		Filesystem:

State: running	Rotational: 0	Removable: No	Port: SATA0

Point:

UUID:

Width:

0%

Disk size: 167.6 GB	Part size: 1 KiB	Free:

Modalias: scsi:t-0x00	HW SATA SPD Limit: <unknown>	SERIAL
Add random: 0	SATA SPD: 6.0 Gbps	ATA
Physical block size: 512	SATA SPD Limit: <unknown>	6 Gb/s
Logical block size: 512	Range: 16	Ext range: 256
Minimum IO size: 512	Max sectors:	Max sectors kb: 1280
Optimal IO size: 0	Max HW sectors kb: 32767	
HW sector size: 512	Max segments: 168	Max segment size: 65536
Rq affinity: 1	Discard max bytes: 21474	Discard granularity: 512
IO stats: 1	Discard zeroes data: 0	
Read ahead kb: 128	BDI stable pages required: 0	
Nr requests: 64	BDI min_ratio: 0	..:Scheduler:..
Nomerges: 0	BDI max_ratio: 100	blk-mq

				7.6.0	sda	sda2	Close

I-Nex / System (as superuser)

CPU | GPU | Mobo | Audio | Drives | System

Distro Vendor: Debian   Distro Release: 10

Desktop environment: MATE 1.20.2

Window manager: Metacity (Marco)

Window manager Theme: Not Found

GTK+ 2 Theme: 'Menta'

GTK+ 3 Theme: 'Menta'

GTK Icons: menta

GTK Font: Cantarell 11

Hostname: jeremiah

Deafult DM: /usr/sbin/gdm3

Timezone: Europe/Sofia   Arch: x86_64

GLX Version: Binutils 2.31.1

X.Org Version: 1.19.2   GCC Version: 8

Wireless-tools: Linux C Library:

PPP: GNU Make Version: 4.2.1

Net-tools: Dynamic linker (ldd): 2.28

▶ Check   Library

7.6.0   ✖ Close

There are other Hardware identification report tools such as [CUDA-Z](#) **-** that are useful to check if you have **Nvidia Video Card** hardware Installed on the PC to check the status of **CUDA** enabled **GPUs,** useful if working with **nVidia Geforce, Quadro, Tesla cards** and **ION chipsets**.

If you use it however be aware that CUDA-Z is not compatible with 3rd-party linux drivers for NVidia so make sure you have the current official Nvidia version.

5. Inxi full featured system information script

Inxi is a 10000 lines mega bash script that fetches hardware details from multiple different sources in /proc /sys and from commands on the system, and generates a beautiful looking console report that non technical users can read easily.

```
nipo@jeremiah:~$ inxi -AG
Graphics:  Device-1: Intel 2nd Generation Core Processor Family Integrated Graphics driver: i915 v: kernel
           Device-2: NVIDIA GF119M [Quadro NVS 4200M] driver: N/A
           Display: x11 server: X.Org 1.20.4 driver: modesetting,nouveau unloaded: fbdev,vesa resolution: 1366x768~60Hz
           OpenGL: renderer: N/A v: N/A
Audio:     Device-1: Intel 6 Series/C200 Series Family High Definition Audio driver: snd_hda_intel
           Sound Server: ALSA v: k4.19.0-5-amd64
```

inxi -Fx

```
hipo@jeremiah:~/Documents$ inxi -Fx
System:     Host: jeremiah Kernel: 4.19.0-5-amd64 x86_64 bits: 64 compiler: gcc v: 8.3.0 Desktop: MATE 1.20.4
            Distro: Debian GNU/Linux 10 (buster)
Machine:    Type: Laptop System: LENOVO product: 4236VBJ v: ThinkPad T420 serial: <root required>
            Mobo: LENOVO model: 4236VBJ serial: <root required> UEFI [Legacy]: LENOVO v: 83ET70WW (1.40 ) date: 06/12/2012
Battery:    ID-1: BAT0 charge: 45.6 Wh condition: 45.9/47.5 Wh (97%) model: SANYO 42T4751 status: Unknown
CPU:        Topology: Dual Core model: Intel Core i7-2640M bits: 64 type: MT MCP arch: Sandy Bridge rev: 7 L2 cache: 4096 KiB
            flags: lm nx pae sse sse2 sse3 sse4_1 sse4_2 ssse3 vmx bogomips: 22327
            Speed: 2659 MHz min/max: 800/3500 MHz Core speeds (MHz): 1: 2659 2: 1982 3: 2058 4: 1776
Graphics:   Device-1: Intel 2nd Generation Core Processor Family Integrated Graphics vendor: Lenovo driver: i915 v: kernel
            bus ID: 00:02.0
            Device-2: NVIDIA GF119M [Quadro NVS 4200M] driver: N/A bus ID: 01:00.0
            Display: x11 server: X.Org 1.20.4 driver: modesetting,nouveau unloaded: fbdev,vesa resolution: 1366x768~60Hz
            OpenGL: renderer: N/A v: N/A direct render: N/A
Audio:      Device-1: Intel 6 Series/C200 Series Family High Definition Audio vendor: Lenovo driver: snd_hda_intel v: kernel
            bus ID: 00:1b.0
            Sound Server: ALSA v: k4.19.0-5-amd64
Network:    Device-1: Intel 82579LM Gigabit Network vendor: Lenovo driver: e1000e v: 3.2.6-k port: 6080 bus ID: 00:19.0
            IF: enp0s25 state: down mac: 00:21:cc:cc:b2:27
            Device-2: Intel Centrino Advanced-N 6205 [Taylor Peak] driver: iwlwifi v: kernel port: efa0 bus ID: 03:00.0
            IF: wlp3s0 state: up mac: 60:67:20:3c:20:ec
            IF-ID-1: br0 state: unknown speed: N/A duplex: N/A mac: 82:11:55:b6:15:d9
Drives:     Local Storage: total: 167.68 GiB used: 138.33 GiB (82.5%)
            ID-1: /dev/sda vendor: Intel model: SSDSC2BW180A3L size: 167.68 GiB
Partition:  ID-1: / size: 156.28 GiB used: 138.26 GiB (88.5%) fs: ext4 dev: /dev/sda1
            ID-2: swap-1 size: 7.88 GiB used: 72.8 MiB (0.9%) fs: swap dev: /dev/sda5
Sensors:    System Temperatures: cpu: 47.0 C mobo: N/A
            Fan Speeds (RPM): cpu: 3515
```

   Each of the pointed above tools has different method of collection of Hardware information from various resources e.g. - kernel loaded modules, dmesg, files like **/proc/meminfo /proc/version /proc/scsi/scsi /proc/partitions.**
Hence some of the tools are likely to report more info than otheres, so in case if some information you need regarding the system plugged in hardware is missing you can perhaps obtain it from another program. Most Linux distribution desktop provided GNOME package are including **Hardinfo** gui tool, but in many cases above mentioned tools are likely to add even more on info on what is inside your PC Box.
If you're aware of others tools that are useful not mentioned here please share it.