16 commands to check hardware information on Linux

binarytides.com/linux-commands-hardware-info

Silver Moon

Hardware information

Like for every thing, there are plenty of commands to check information about the hardware of your linux system. Some commands report only specific hardware components like cpu or memory while the rest cover multiple hardware units.

This post takes a quick look at some of the most commonly used commands to check information and configuration details about various hardware peripherals and devices. The list includes lscpu, hwinfo, lshw, dmidecode, lspci etc.

1. lscpu

The lscpu command reports information about the cpu and processing units. It does not have any further options or functionality.

```
$ lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                4
On-line CPU(s) list:   0-3
Thread(s) per core:    1
Core(s) per socket:    4
Socket(s):             1
NUMA node(s):          1
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 23
Stepping:              10
CPU MHz:               1998.000
BogoMIPS:              5302.48
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              2048K
NUMA node0 CPU(s):     0-3
```

2. lshw - List Hardware

A general purpose utility, that reports detailed and brief information about multiple different hardware units such as cpu, memory, disk, usb controllers, network adapters etc. Lshw extracts the information from different /proc files.

```
$ sudo lshw -short

H/W path        Device      Class       Description
=================================================
                            system      ()
/0                          bus         DG35EC
/0/0                        processor   Intel(R) Core(TM)2 Quad CPU    Q8400  @ 2.66GHz
/0/0/1                      memory      2MiB L2 cache
/0/0/3                      memory      32KiB L1 cache
/0/2                        memory      32KiB L1 cache
/0/4                        memory      64KiB BIOS
/0/14                       memory      8GiB System Memory
/0/14/0                     memory      2GiB DIMM DDR2 Synchronous 667 MHz (1.5 ns)
/0/14/1                     memory      2GiB DIMM DDR2 Synchronous 667 MHz (1.5 ns)
/0/14/2                     memory      2GiB DIMM DDR2 Synchronous 667 MHz (1.5 ns)
/0/14/3                     memory      2GiB DIMM DDR2 Synchronous 667 MHz (1.5 ns)
/0/100                      bridge      82G35 Express DRAM Controller
/0/100/2                    display     82G35 Express Integrated Graphics Controller
/0/100/2.1                  display     82G35 Express Integrated Graphics Controller
/0/100/19       eth0        network     82566DC Gigabit Network Connection
/0/100/1a                   bus         82801H (ICH8 Family) USB UHCI Controller #4
/0/100/1a.1                 bus         82801H (ICH8 Family) USB UHCI Controller #5
/0/100/1a.7                 bus         82801H (ICH8 Family) USB2 EHCI Controller #2
/0/100/1b                   multimedia  82801H (ICH8 Family) HD Audio Controller
/0/100/1c                   bridge      82801H (ICH8 Family) PCI Express Port 1
/0/100/1c.1                 bridge      82801H (ICH8 Family) PCI Express Port 2
/0/100/1c.2                 bridge      82801H (ICH8 Family) PCI Express Port 3
/0/100/1c.2/0               storage     JMB368 IDE controller
/0/100/1d                   bus         82801H (ICH8 Family) USB UHCI Controller #1
/0/100/1d.1                 bus         82801H (ICH8 Family) USB UHCI Controller #2
/0/100/1d.2                 bus         82801H (ICH8 Family) USB UHCI Controller #3
/0/100/1d.7                 bus         82801H (ICH8 Family) USB2 EHCI Controller #1
/0/100/1e                   bridge      82801 PCI Bridge
/0/100/1e/5                 bus         FW322/323 [TrueFire] 1394a Controller
/0/100/1f                   bridge      82801HB/HR (ICH8/R) LPC Interface Controller
/0/100/1f.2                 storage     82801H (ICH8 Family) 4 port SATA Controller
[IDE mode]
/0/100/1f.3                 bus         82801H (ICH8 Family) SMBus Controller
/0/100/1f.5                 storage     82801HR/HO/HH (ICH8R/DO/DH) 2 port SATA
Controller [IDE m
/0/1            scsi3       storage
/0/1/0.0.0      /dev/sda    disk        500GB ST3500418AS
/0/1/0.0.0/1    /dev/sda1   volume      70GiB Windows NTFS volume
/0/1/0.0.0/2    /dev/sda2   volume      395GiB Extended partition
/0/1/0.0.0/2/5  /dev/sda5   volume      97GiB HPFS/NTFS partition
/0/1/0.0.0/2/6  /dev/sda6   volume      97GiB Linux filesystem partition
/0/1/0.0.0/2/7  /dev/sda7   volume      1952MiB Linux swap / Solaris partition
/0/1/0.0.0/2/8  /dev/sda8   volume      198GiB Linux filesystem partition
/0/3            scsi4       storage
/0/3/0.0.0      /dev/cdrom  disk        DVD RW DRU-190A
```

Check out the following post to learn more about lshw

Get hardware information on Linux with lshw command

3. hwinfo - Hardware Information

Hwinfo is another general purpose hardware probing utility that can report detailed and brief information about multiple different hardware components, and more than what lshw can report.

```
$ hwinfo --short
cpu:
                        Intel(R) Core(TM)2 Quad CPU    Q8400  @ 2.66GHz, 2000 MHz
                        Intel(R) Core(TM)2 Quad CPU    Q8400  @ 2.66GHz, 2000 MHz
                        Intel(R) Core(TM)2 Quad CPU    Q8400  @ 2.66GHz, 2666 MHz
                        Intel(R) Core(TM)2 Quad CPU    Q8400  @ 2.66GHz, 2666 MHz
keyboard:
  /dev/input/event2     AT Translated Set 2 keyboard
mouse:
  /dev/input/mice       Microsoft Basic Optical Mouse v2.0
graphics card:
                        Intel 965G-1
                        Intel 82G35 Express Integrated Graphics Controller
sound:
                        Intel 82801H (ICH8 Family) HD Audio Controller
storage:
                        Intel 82801H (ICH8 Family) 4 port SATA IDE Controller
                        Intel 82801H (ICH8 Family) 2 port SATA IDE Controller
                        JMicron JMB368 IDE controller
network:
  eth0                  Intel 82566DC Gigabit Network Connection
network interface:
  eth0                  Ethernet network interface
  lo                    Loopback network interface
disk:
  /dev/sda              ST3500418AS
partition:
  /dev/sda1             Partition
  /dev/sda2             Partition
  /dev/sda5             Partition
  /dev/sda6             Partition
  /dev/sda7             Partition
  /dev/sda8             Partition
cdrom:
  /dev/sr0              SONY DVD RW DRU-190A
usb controller:
                        Intel 82801H (ICH8 Family) USB UHCI Controller #4
                        Intel 82801H (ICH8 Family) USB UHCI Controller #5
                        Intel 82801H (ICH8 Family) USB2 EHCI Controller #2
                        Intel 82801H (ICH8 Family) USB UHCI Controller #1
                        Intel 82801H (ICH8 Family) USB UHCI Controller #2
                        Intel 82801H (ICH8 Family) USB UHCI Controller #3
                        Intel 82801H (ICH8 Family) USB2 EHCI Controller #1
bios:
                        BIOS

... TRUNCATED ...
```

Check out our previous post on hwinfo
Check hardware information on Linux with hwinfo command

4. lspci - List PCI

The lspci command lists out all the pci buses and details about the devices connected to them.
The vga adapter, graphics card, network adapter, usb ports, sata controllers, etc all fall under this category.

```
$ lspci
00:00.0 Host bridge: Intel Corporation 82G35 Express DRAM Controller (rev 03)
00:02.0 VGA compatible controller: Intel Corporation 82G35 Express Integrated Graphics
Controller (rev 03)
00:02.1 Display controller: Intel Corporation 82G35 Express Integrated Graphics
Controller (rev 03)
00:19.0 Ethernet controller: Intel Corporation 82566DC Gigabit Network Connection (rev
02)
00:1a.0 USB controller: Intel Corporation 82801H (ICH8 Family) USB UHCI Controller #4
(rev 02)
00:1a.1 USB controller: Intel Corporation 82801H (ICH8 Family) USB UHCI Controller #5
(rev 02)
00:1a.7 USB controller: Intel Corporation 82801H (ICH8 Family) USB2 EHCI Controller #2
(rev 02)
00:1b.0 Audio device: Intel Corporation 82801H (ICH8 Family) HD Audio Controller (rev
02)
00:1c.0 PCI bridge: Intel Corporation 82801H (ICH8 Family) PCI Express Port 1 (rev 02)
00:1c.1 PCI bridge: Intel Corporation 82801H (ICH8 Family) PCI Express Port 2 (rev 02)
00:1c.2 PCI bridge: Intel Corporation 82801H (ICH8 Family) PCI Express Port 3 (rev 02)
00:1d.0 USB controller: Intel Corporation 82801H (ICH8 Family) USB UHCI Controller #1
(rev 02)
00:1d.1 USB controller: Intel Corporation 82801H (ICH8 Family) USB UHCI Controller #2
(rev 02)
00:1d.2 USB controller: Intel Corporation 82801H (ICH8 Family) USB UHCI Controller #3
(rev 02)
00:1d.7 USB controller: Intel Corporation 82801H (ICH8 Family) USB2 EHCI Controller #1
(rev 02)
00:1e.0 PCI bridge: Intel Corporation 82801 PCI Bridge (rev f2)
00:1f.0 ISA bridge: Intel Corporation 82801HB/HR (ICH8/R) LPC Interface Controller (rev
02)
00:1f.2 IDE interface: Intel Corporation 82801H (ICH8 Family) 4 port SATA Controller
[IDE mode] (rev 02)
00:1f.3 SMBus: Intel Corporation 82801H (ICH8 Family) SMBus Controller (rev 02)
00:1f.5 IDE interface: Intel Corporation 82801HR/HO/HH (ICH8R/DO/DH) 2 port SATA
Controller [IDE mode] (rev 02)
03:00.0 IDE interface: JMicron Technology Corp. JMB368 IDE controller
04:05.0 FireWire (IEEE 1394): LSI Corporation FW322/323 [TrueFire] 1394a Controller
(rev 70)
```

Filter out specific device information with grep.

```
$ lspci -v | grep "VGA" -A 12
```

5. lsscsi - List scsi devices

Lists out the scsi/sata devices like hard drives and optical drives.

```
$ lsscsi
[3:0:0:0]    disk    ATA      ST3500418AS      CC38  /dev/sda
[4:0:0:0]    cd/dvd  SONY     DVD RW DRU-190A  1.63  /dev/sr0
```

6. lsusb - List usb buses and device details

This command shows the USB controllers and details about devices connected to them. By default brief information is printed. Use the verbose option "-v" to print detailed information about each usb port

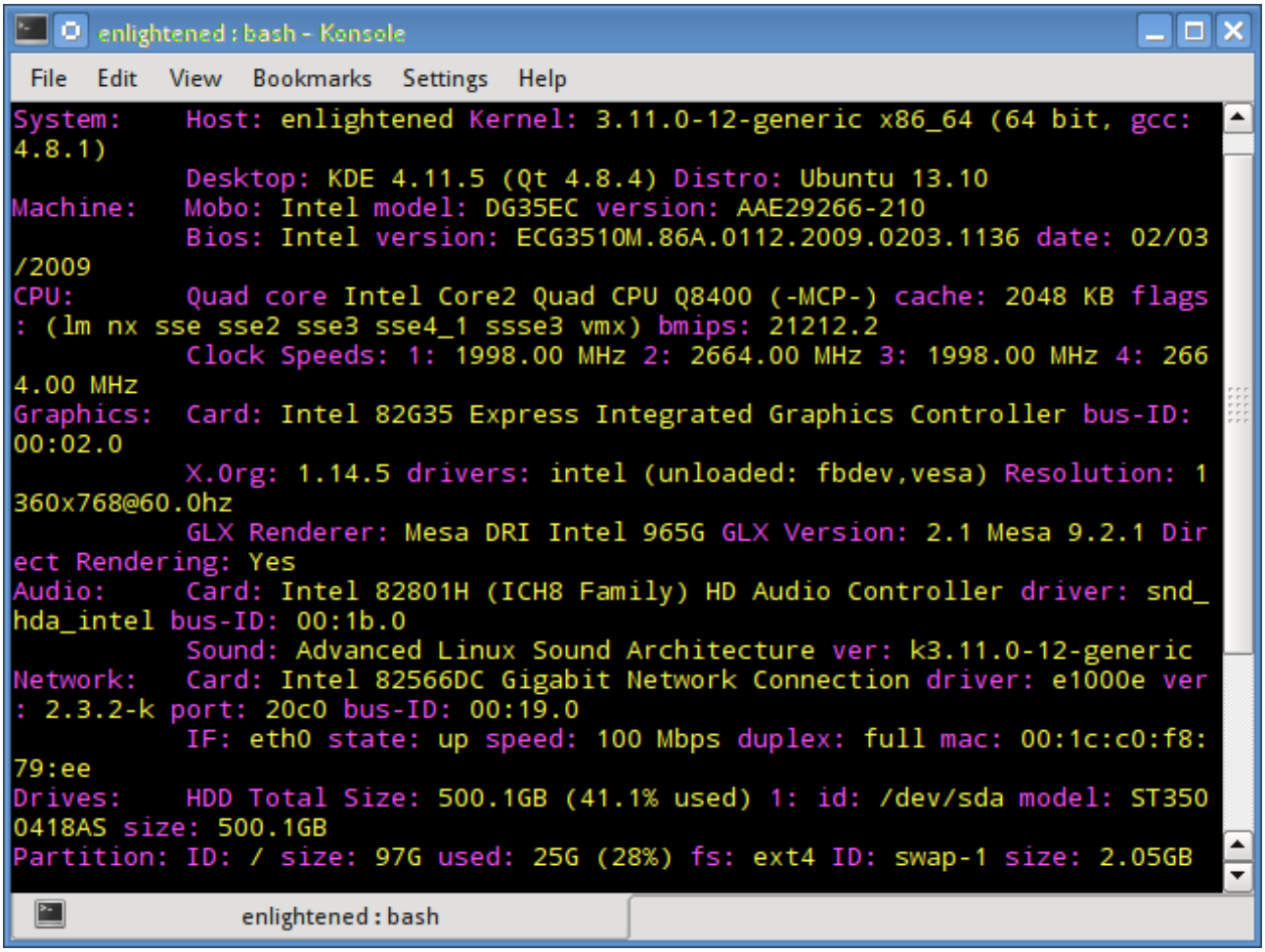
```
$ lsusb
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 007 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 006 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 005 Device 002: ID 045e:00cb Microsoft Corp. Basic Optical Mouse v2.0
Bus 005 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 004 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 003 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
```

On the above system, 1 usb port is being used by the mouse.

7. Inxi

Inxi is a 10K line mega bash script that fetches hardware details from multiple different sources and commands on the system, and generates a beautiful looking report that non technical users can read easily.

```
$ inxi -Fx
```



8. lsblk - List block devices

List out information all block devices, which are the hard drive partitions and other storage devices like optical drives and flash drives

```
$ lsblk
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda      8:0    0 465.8G  0 disk
├─sda1   8:1    0    70G  0 part
├─sda2   8:2    0     1K  0 part
├─sda5   8:5    0  97.7G  0 part /media/4668484A68483B47
├─sda6   8:6    0  97.7G  0 part /
├─sda7   8:7    0   1.9G  0 part [SWAP]
└─sda8   8:8    0 198.5G  0 part /media/13f35f59-f023-4d98-b06f-9dfaebefd6c1
sr0     11:0    1  1024M  0 rom
```

9. df - disk space of file systems

Reports various partitions, their mount points and the used and available space on each.

```
$ df -H
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda6       104G   26G   73G  26% /
none            4.1k     0  4.1k   0% /sys/fs/cgroup
udev            4.2G  4.1k  4.2G   1% /dev
tmpfs           837M  1.6M  835M   1% /run
none            5.3M     0  5.3M   0% /run/lock
none            4.2G   13M  4.2G   1% /run/shm
none            105M   21k  105M   1% /run/user
/dev/sda8       210G  149G   51G  75% /media/13f35f59-f023-4d98-b06f-9dfaebefd6c1
/dev/sda5       105G   31G   75G  30% /media/4668484A68483B47
```

10. Pydf - Python df

An improved df version written in python, that displays colored output that looks better than df

```
$ pydf
Filesystem Size Used Avail Use%          Mounted on
/dev/sda6   96G  23G   68G 24.4 [#.....] /
/dev/sda8  195G 138G   47G 70.6 [####..] /media/13f35f59-f023-4d98-b06f-9dfaebefd6c1
/dev/sda5   98G  28G   69G 29.2 [##....] /media/4668484A68483B47
```

11. fdisk

Fdisk is a utility to modify partitions on hard drives, and can be used to list out the partition information as well.

```
$ sudo fdisk -l

Disk /dev/sda: 500.1 GB, 500107862016 bytes
255 heads, 63 sectors/track, 60801 cylinders, total 976773168 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x30093008

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *          63   146801969    73400953+   7  HPFS/NTFS/exFAT
/dev/sda2       146802031   976771071   414984520+   f  W95 Ext'd (LBA)
/dev/sda5       146802033   351614654   102406311    7  HPFS/NTFS/exFAT
/dev/sda6       351614718   556427339   102406311   83  Linux
/dev/sda7       556429312   560427007     1998848   82  Linux swap / Solaris
/dev/sda8       560429056   976771071   208171008   83  Linux
```

12. mount

The mount is used to mount/unmount and view mounted file systems.

```
$ mount | column -t
/dev/sda6    on  /                                          type  ext4
(rw,errors=remount-ro)
proc         on  /proc                                      type  proc
(rw,noexec,nosuid,nodev)
sysfs        on  /sys                                       type  sysfs
(rw,noexec,nosuid,nodev)
none         on  /sys/fs/cgroup                             type  tmpfs
(rw)
none         on  /sys/fs/fuse/connections                   type  fusectl
(rw)
none         on  /sys/kernel/debug                          type  debugfs
(rw)
none         on  /sys/kernel/security                       type  securityfs
(rw)
udev         on  /dev                                       type  devtmpfs
(rw,mode=0755)
devpts       on  /dev/pts                                   type  devpts
(rw,noexec,nosuid,gid=5,mode=0620)
tmpfs        on  /run                                       type  tmpfs
(rw,noexec,nosuid,size=10%,mode=0755)
none         on  /run/lock                                  type  tmpfs
(rw,noexec,nosuid,nodev,size=5242880)
none         on  /run/shm                                   type  tmpfs
(rw,nosuid,nodev)
none         on  /run/user                                  type  tmpfs
(rw,noexec,nosuid,nodev,size=104857600,mode=0755)
none         on  /sys/fs/pstore                             type  pstore
(rw)
/dev/sda8    on  /media/13f35f59-f023-4d98-b06f-9dfaebefd6c1  type  ext4
(rw,nosuid,nodev,errors=remount-ro)
/dev/sda5    on  /media/4668484A68483B47                    type  fuseblk
(rw,nosuid,nodev,allow_other,blksize=4096)
binfmt_misc  on  /proc/sys/fs/binfmt_misc                   type  binfmt_misc
(rw,noexec,nosuid,nodev)
systemd      on  /sys/fs/cgroup/systemd                     type  cgroup
(rw,noexec,nosuid,nodev,none,name=systemd)
gvfsd-fuse   on  /run/user/1000/gvfs                        type  fuse.gvfsd-fuse
(rw,nosuid,nodev,user=enlightened)
```

Again, use grep to filter out only those file systems that you want to see

```
$ mount | column -t | grep ext
```

13. free - Check RAM

Check the amount of used, free and total amount of RAM on system with the free command.

```
$ free -m
             total       used       free     shared    buffers     cached
Mem:          7975       5865       2110          0         24        622
-/+ buffers/cache:       5218       2757
Swap:         1951        921       1030
```

14. dmidecode

The dmidecode command is different from all other commands. It extracts hardware information by reading data from the SMBOIS data structures (also called DMI tables).

```
# display information about the processor/cpu
$ sudo dmidecode -t processor

# memory/ram information
$ sudo dmidecode -t memory

# bios details
$ sudo dmidecode -t bios
```

Check out the man page for more details.

15. /proc files

Many of the virtual files in the /proc directory contain information about hardware and configurations. Here are some of them

CPU/Memory information

```
# cpu information
$ cat /proc/cpuinfo

# memory information
$ cat /proc/meminfo
```

Linux/kernel information

```
$ cat /proc/version
Linux version 3.11.0-12-generic (buildd@allspice) (gcc version 4.8.1 (Ubuntu/Linaro
4.8.1-10ubuntu7) ) #19-Ubuntu SMP Wed Oct 9 16:20:46 UTC 2013
```

SCSI/Sata devices

```
$ cat /proc/scsi/scsi
Attached devices:
Host: scsi3 Channel: 00 Id: 00 Lun: 00
  Vendor: ATA      Model: ST3500418AS      Rev: CC38
  Type:   Direct-Access                    ANSI  SCSI revision: 05
Host: scsi4 Channel: 00 Id: 00 Lun: 00
  Vendor: SONY     Model: DVD RW DRU-190A  Rev: 1.63
  Type:   CD-ROM                           ANSI  SCSI revision: 05
```

Partitions

```
$ cat /proc/partitions
major minor  #blocks  name

   8        0  488386584 sda
   8        1   73400953 sda1
   8        2          1 sda2
   8        5  102406311 sda5
   8        6  102406311 sda6
   8        7    1998848 sda7
   8        8  208171008 sda8
  11        0    1048575 sr0
```

16. hdparm

The hdparm command gets information about sata devices like hard disks.

```
$ sudo hdparm -i /dev/sda

/dev/sda:

 Model=ST3500418AS, FwRev=CC38, SerialNo=9VMJXV1N
 Config={ HardSect NotMFM HdSw>15uSec Fixed DTR>10Mbs RotSpdTol>.5% }
 RawCHS=16383/16/63, TrkSize=0, SectSize=0, ECCbytes=4
 BuffType=unknown, BuffSize=16384kB, MaxMultSect=16, MultSect=16
 CurCHS=16383/16/63, CurSects=16514064, LBA=yes, LBAsects=976773168
 IORDY=on/off, tPIO={min:120,w/IORDY:120}, tDMA={min:120,rec:120}
 PIO modes:  pio0 pio1 pio2 pio3 pio4
 DMA modes:  mdma0 mdma1 mdma2
 UDMA modes: udma0 udma1 udma2 udma3 udma4 udma5 *udma6
 AdvancedPM=no WriteCache=enabled
 Drive conforms to: unknown:  ATA/ATAPI-4,5,6,7

 * signifies the current active mode
```

Summary

Each of the command has a slightly different method of extracting information, and you may need to try more than one of them, while looking for specific hardware details. However they are available across most linux distros, and can be easily installed from the default repositories.

On the desktop there are gui tools, for those who do not want to memorise and type commands. Hardinfo, I-nex are some of the popular ones that provide detailed information about multiple different hardware components.

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