

Operating Systems

Spring 2018

S03

Professor : Philippe Cudré-Mauroux
Assistant : Ines Arous

Submitted by Sylvain Julmy

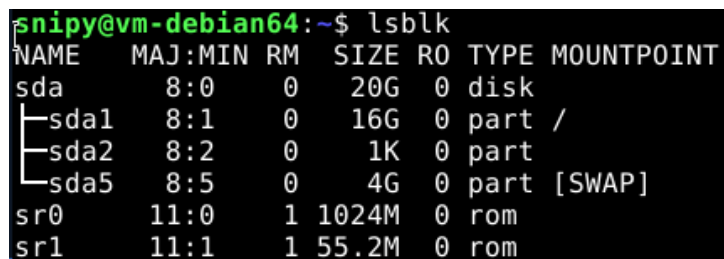
Exercice 2

Root Disk

We use the following command :

`lsblk`

In order to obtain the full information about the block devices we have. Figure 1 shows the output of the command.



```
snipy@vm-debian64:~$ lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda          8:0    0   20G  0 disk
├─sda1       8:1    0   16G  0 part /
├─sda2       8:2    0    1K  0 part
└─sda5       8:5    0    4G  0 part [SWAP]
sr0         11:0    1 1024M  0 rom
sr1         11:1    1  55.2M  0 rom
```

Figure 1: Output of the `lsblk` command.

Processor Architecture

We use the following command :

`lscpu`

Figure 2 shows the output of the command.

Graphic Card

We use the following command :

`lspci -vnn | grep VGA -A 12`

Note : because we are inside a virtual machine, the operating system has no access to the material directly. So figures 4

```
snipy@vm-debian64:~$ lscpu
Architecture : x86_64
Mode(s) opératoire(s) des processeurs : 32-bit, 64-bit
Boutisme : Little Endian
Processeur(s) : 3
Liste de processeur(s) en ligne : 0-2
Thread(s) par cœur : 1
Cœur(s) par socket : 3
Socket(s) : 1
Nœud(s) NUMA : 1
Identifiant constructeur : GenuineIntel
Famille de processeur : 6
Modèle : 60
Nom de modèle : Intel(R) Core(TM) i7-4810MQ CPU @ 2.80GHz
Révision : 3
Vitesse du processeur en MHz : 2793.542
BogoMIPS : 5587.08
Constructeur d'hyperviseur : KVM
Type de virtualisation : complet
Cache L1d : 32K
Cache L1i : 32K
Cache L2 : 256K
Cache L3 : 6144K
Nœud NUMA 0 de processeur(s) : 0-2
Flags: fpu vme de pse tsc msr pae mce cx8 apic
h mmx fxsr sse sse2 ht syscall nx rdtscp lm constant_tsc rep_g
pni pclmulqdq ssse3 cx16 pcid sse4_1 sse4_2 x2apic movbe popc
lm abm fsgsbase avx2 invpcid
```

Figure 2: Output of the `lscpu` command.

```
snipy@vm-debian64:~$ lspci -vnn | grep VGA -A 12
00:02.0 VGA compatible controller [0300]: InnoTek Systemberatung GmbH VirtualBox Graphics Adapter [80
ee:beef] (prog-if 00 [VGA controller])
Flags: fast devsel, IRQ 10
Memory at e0000000 (32-bit, prefetchable) [size=16M]
[virtual] Expansion ROM at 000c0000 [disabled] [size=128K]
```

Figure 3: Output of the `lspci -vnn | grep VGA -A 12` command.

Memory Size

We just look at the file `/proc/meminfo` to obtain the information. Figures 7 shows the output of the `cat` command.

Kernel Version

We use the following command :

```
uname -a
```

Figure 7 shows the output of the `uname -a` command.

Network Card Speed

We use the following command (in superuser mode):

```
lshw -class network
```

Figure 7 shows the output of the `lshw -class network` command.

```

snipy@snipy-anarchy ~$ lspci -vnn | grep VGA -A 12
00:02.0 VGA compatible controller [0300]: Intel Corporation 4th Gen Core Processor Integrated Graphics
Subsystem: Lenovo 4th Gen Core Processor Integrated Graphics Controller [17aa:221e]
Flags: bus master, fast devsel, latency 0, IRQ 33
Memory at b1400000 (64-bit, non-prefetchable) [size=4M]
Memory at a0000000 (64-bit, prefetchable) [size=256M]
I/O ports at 5000 [size=64]
[virtual] Expansion ROM at 000c0000 [disabled] [size=128K]
Capabilities: <access denied>
Kernel driver in use: i915
Kernel modules: i915

00:03.0 Audio device [0403]: Intel Corporation Xeon E3-1200 v3/4th Gen Core Processor HD Audio Control
Subsystem: Lenovo Xeon E3-1200 v3/4th Gen Core Processor HD Audio Controller [17aa:2211]
--
01:00.0 VGA compatible controller [0300]: NVIDIA Corporation GK106GLM [Quadro K2100M] [10de:11fc] (rev
Subsystem: Lenovo GK106GLM [Quadro K2100M] [17aa:221e]
Flags: fast devsel, IRQ 31
Memory at b0000000 (32-bit, non-prefetchable) [size=16M]
Memory at 80000000 (64-bit, prefetchable) [size=256M]
Memory at 90000000 (64-bit, prefetchable) [size=32M]
I/O ports at 4000 [size=128]
Expansion ROM at b1000000 [disabled] [size=512K]
Capabilities: <access denied>
Kernel driver in use: nouveau
Kernel modules: nouveau

```

Figure 4: Output of the `lspci -vnn | grep VGA -A 12` command inside a native installation of linux.

```

snipy@vm-debian64:~$ cat /proc/meminfo
MemTotal:      4050784 kB
MemFree:       3546084 kB
MemAvailable:  3615856 kB
Buffers:       28580 kB
Cached:        237740 kB
SwapCached:    0 kB
Active:        311720 kB
Inactive:      114384 kB
Active(anon):  160328 kB
Inactive(anon): 6728 kB
Active(file):  151392 kB
Inactive(file): 107656 kB
Unevictable:   96 kB
Mlocked:       96 kB
SwapTotal:     4192252 kB
SwapFree:      4192252 kB
Dirty:         0 kB
Writeback:     0 kB
AnonPages:     159900 kB
Mapped:        98040 kB
Shmem:         7276 kB
Slab:          42424 kB
SReclaimable:  27556 kB
SUnreclaim:    14868 kB
KernelStack:   3120 kB
PageTables:    13208 kB
NFS_Unstable:  0 kB
Bounce:        0 kB
WritebackTmp:  0 kB

```

Figure 5: Output of the `/proc/meminfo` file.

```

snipy@vm-debian64:~$ uname -a
Linux vm-debian64 4.9.0-4-amd64 #1 SMP Debian 4.9.65-3+deb9u1 (2017-12-23) x86_64 GNU/Linux

```

Figure 6: Output of the `uname -a` command.

```

root@vm-debian64:/home/snipy# lshw -class network
*-network
   description: Ethernet interface
   produit: 82540EM Gigabit Ethernet Controller
   fabricant: Intel Corporation
   identifiant matériel: 3
   information bus: pci@0000:00:03.0
   nom logique: enp0s3
   version: 02
   numéro de série: 08:00:27:d1:a4:1a
   taille: 1Gbit/s
   capacité: 1Gbit/s
   bits: 32 bits
   horloge: 66MHz
   fonctionnalités: pm pcix bus_master cap_list ethernet physical tp 10bt 10bt-fd 100bt 100bt-fd
1000bt-fd autonegotiation
   configuration: autonegotiation=on broadcast=yes driver=e1000 driverversion=7.3.21-k8-NAPI duplex=full ip=10.0.2.15 latency=64 link=yes mingnt=255 multicast=yes port=twisted pair speed=1Gbit/s
   ressources: irq:19 mémoire:f0000000-f001ffff portE/S:d010(taille=8)

```

Figure 7: Output of the `lshw -class network` command.

Exercise 3

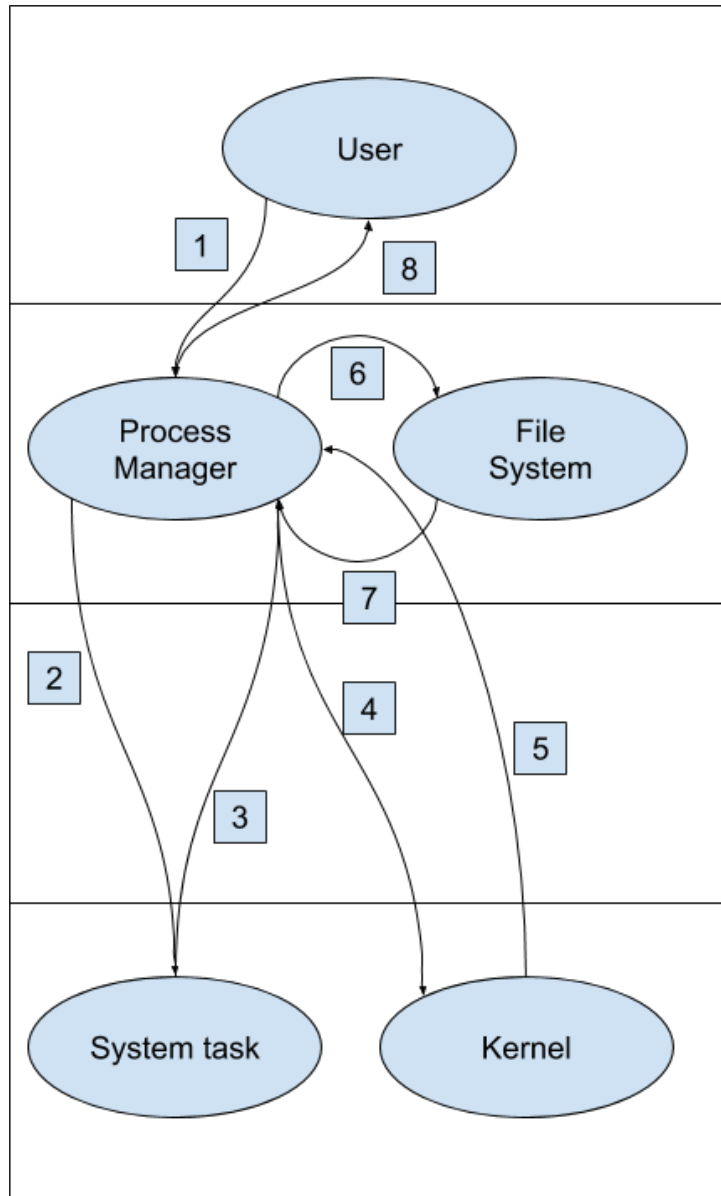


Figure 8: Path execution of the `fork()` system call in Minix.

Exercise 4

The following C program create two process and each of them are printing their process id and priority value.

```
#include <stdio.h>
#include <unistd.h>
#include <sys/resource.h>

void main(void)
{
    int pid;

    pid = fork();
    // from here there are two process

    printf("PID : %d PRIO : %d\n", pid, getpriority(PRIO_PROCESS, 0));
}
```

We use the following CMAKE file in order to compile our program.

```
1 cmake_minimum_required(VERSION 3.9)
2 project(OS-S03)
3
4 set(CMAKE_C_STANDARD 11)
5
6 add_executable(how_nice how_nice.c)
```

And one of the output of the program :

```
./how_nice
PID : 26835 PRIO : 0
PID : 0 PRIO : 0
```