



# Disk Management - Deel 2

## Troubleshooting tools and UUIDS

**DE HOGESCHOOL  
MET HET NETWERK**

Hogeschool PXL – Dep. PXL-IT – Elfde-Liniestraat 26 – B-3500 Hasselt  
[www.pxl.be](http://www.pxl.be) - [www.pxl.be/facebook](http://www.pxl.be/facebook)



# Troubleshooting tools

- lsof (list open files)
  - geeft een overzicht van alle open files

```
student@ubserv:~$ tail -f /var/log/syslog &  
[1] 1789
```

```
student@ubserv:~$ jobs  
[1]+  Running                  tail -f /var/log/syslog &
```

```
student@ubserv:~$ sudo lsof | grep -E COMMAND\!tail.*student
```

COMMAND	PID	TID	USER	FD	TYPE	DEVICE	SIZE/OFF	NODE	NAME
tail	1789		student	cwd	DIR	8,1	4096	655364	/home/student
tail	1789		student	rtd	DIR	8,1	4096	2	/
tail	1789		student	txt	REG	8,1	64320	917890	/usr/bin/tail
tail	1789		student	mem	REG	8,1	2919792	923329	/usr/lib/locale/locale-archive
tail	1789		student	mem	REG	8,1	1845024	402137	/lib/x86_64-linux-gnu/libc-2.19.so
tail	1789		student	mem	REG	8,1	149120	402138	/lib/x86_64-linux-gnu/ld-2.19.so
tail	1789		student	0u	CHR	4,1	0t0	5875	/dev/tty1
tail	1789		student	1u	CHR	4,1	0t0	5875	/dev/tty1
tail	1789		student	2u	CHR	4,1	0t0	5875	/dev/tty1
tail	1789		student	3r	REG	8,1	3436757	527824	/var/log/syslog
tail	1789		student	4r	0000	0,9	0	5816	anon_inode

cwd=current working directory    rtd=root directory    txt=text/binary    mem=memory mapped file    r=read    w=write    u=update (r+w)  
DIR=directory    REG=regular file    CHR=character special file    xxxx=unknown type

# Troubleshooting tools

- **fuser** (filesystem user)
  - wie is met welke commando's aan het werken op een bepaald mountpoint

```
student@ubserv:~$ tail -f /var/log/syslog &  
[1] 1789
```

```
student@ubserv:~$ jobs  
[1]+  Running                  tail -f /var/log/syslog &
```

```
student@ubserv:~$ ps  
  PID TTY          TIME CMD  
 1648 tty1        00:00:00 bash  
 1789 tty1        00:00:00 tail  
 1940 tty1        00:00:00 ps
```

```
student@ubserv:~$ fuser -v -m / |& grep -E USER\\|tail  
USER          PID ACCESS COMMAND  
/:            root    kernel mount /  
              student 1789 frce. tail
```

-m: om het volledig  
mountpoint / te bekijken

c: current dir  
e: executable  
f: open file  
F: open file for writing  
r: root dir  
m: mapped file or shared library

# Troubleshooting tools

- **fuser** (filesystem user)
  - om te achterhalen wie een bepaald bestand heeft geopend en met welk commando

```
student@ubserv:~$ tail -f /var/log/syslog &  
[1] 1789
```

```
student@ubserv:~$ jobs  
[1]+  Running                  tail -f /var/log/syslog &
```

```
student@ubserv:~$ ps  
  PID TTY          TIME CMD  
 1648 tty1        00:00:00 bash  
 1789 tty1        00:00:00 tail  
 1940 tty1        00:00:00 ps
```

```
student@ubserv:~$ fuser -v /var/log/syslog  
USER      PID ACCESS COMMAND  
/var/log/syslog: student 1789 f.... tail
```

f=open file

c=current dir

e=executable being run

r=root dir

# Troubleshooting tools

- iostat (io statistics)
  - Geeft IO-statistieken weergegeven op specifieke tijdsintervallen

-p ALL=geef per partitie voor alle partities  
 10=om te 10 seconden updates tonen  
 3=Toon drie maal de statistieken

```
student@ubserv:~$ iostat -p ALL 10 3
Linux 3.13.0-32-generic (ubserv)      10/08/2014      _x86_64_

avg-cpu:  %user   %nice %system %iowait  %steal   %idle
           0.18    0.00    0.79    0.02    0.00   99.01

Device:            tps    kB_read/s    kB_wrtn/s    kB_read    kB_wrtn
ram0                0.00         0.00         0.00         0         0
ram1                0.00         0.00         0.00         0         0
ram2                0.00         0.00         0.00         0         0
ram3                0.00         0.00         0.00         0         0
ram4                0.00         0.00         0.00         0         0
ram5                0.00         0.00         0.00         0         0
ram6                0.00         0.00         0.00         0         0
ram7                0.00         0.00         0.00         0         0
ram8                0.00         0.00         0.00         0         0
ram9                0.00         0.00         0.00         0         0
ram10               0.00         0.00         0.00         0         0
ram11               0.00         0.00         0.00         0         0
ram12               0.00         0.00         0.00         0         0
ram13               0.00         0.00         0.00         0         0
ram14               0.00         0.00         0.00         0         0
ram15               0.00         0.00         0.00         0         0
loop0               0.00         0.00         0.00         0         0
loop1               0.00         0.00         0.00         0         0
loop2               0.00         0.00         0.00         0         0
loop3               0.00         0.00         0.00         0         0
loop4               0.00         0.00         0.00         0         0
loop5               0.00         0.00         0.00         0         0
loop6               0.00         0.00         0.00         0         0
loop7               0.00         0.00         0.00         0         0
fd0                 0.00         0.00         0.00         0         0
scd0                0.00         0.00         0.00         0         0
sda                 0.68        19.88         9.87       223927       111188
sda1                0.64        19.72         9.87       222105       111188
sda2                0.00         0.00         0.00         2         0
sda5                0.02         0.10         0.00        1096         0
```

# Troubleshooting tools

- **iotop** (io top usage info)
  - Geeft continue IO-statistieken met de hoogste bovenaan

```
student@ubserv:~$ sudo iotop -o
```

Total DISK READ :	0.00 B/s	Total DISK WRITE :	0.00 B/s				
Actual DISK READ:	0.00 B/s	Actual DISK WRITE:	0.00 B/s				
TID	PRI	USER	DISK READ	DISK WRITE	SWAPIN	IO>	COMMAND

-o = enkel de processen laten zien die IO gebruiken

# Troubleshooting tools

- **vmstat** (Virtual Memory Statistics)
  - Geeft statistieken over het gebruik van RAM en swapfile

```
student@ubserv:~$ vmstat -SM 5 3
procs -----memory----- --swap-- ----io---- -system-- -----cpu-----
 r  b   swpd   free   buff   cache   si   so    bi    bo    in   cs  us  sy  id  wa  st
 0  0     0    531    61    210    0    0    20    13    40   89   0   1  99   0   0
 0  0     0    531    61    210    0    0     0     0    38   80   0   1  99   0   0
 0  0     0    531    61    210    0    0     0     2    38   81   0   1  99   0   0
```

SM=in MB    5=om de vijf seconden    3=drie maal

# UUIDS

- UUID
  - Universally Unique Identifier
  - om objecten uniek aan te duiden
  - 128bit



# Achterhalen van UUIDS

- tune2fs

```
student@ubserv:~$ tune2fs -l /dev/sda1
tune2fs 1.42.9 (4-Feb-2014)
tune2fs: Permission denied while trying to open /dev/sda1
Couldn't find valid filesystem superblock.
student@ubserv:~$ sudo !!
sudo tune2fs -l /dev/sda1
tune2fs 1.42.9 (4-Feb-2014)
Filesystem volume name:   <none>
Last mounted on:         /
Filesystem UUID:          e5cdef95-7817-444b-b517-28b4b027c423
Filesystem magic number:  0xEF53
Filesystem revision #:    1 (dynamic)
Filesystem features:      has_journal ext_attr resize_inode dir_
Filesystem flags:         signed_directory_hash
Default mount options:    user_xattr acl
Filesystem state:         clean
```

# Achterhalen van UUIDS

- blkid

```
student@ubserv:~$ sudo blkid
/dev/sda1: UUID="e5cdef95-7817-444b-b517-28b4b027c423" TYPE="ext4"
/dev/sda5: UUID="26f9a596-9727-48ed-b24a-820df9d028b8" TYPE="swap"
```

- ls -l

```
student@ubserv:~$ ls -l /dev/disk/by-uuid/
total 0
lrwxrwxrwx 1 root root 10 Oct  8 18:19 26f9a596-9727-48ed-b24a-820df9d028b8 -> ../../sda5
lrwxrwxrwx 1 root root 10 Oct  8 18:19 e5cdef95-7817-444b-b517-28b4b027c423 -> ../../sda1
```

- file -s

```
student@ubserv:~$ sudo file -s /dev/sd* | grep -e swap -e ext
/dev/sda1: Linux rev 1.0 ext4 filesystem data, UUID=e5cdef95-7817-444b-b517-28b4b027c423 (needs journal recovery) (extents) (large files)
/dev/sda5: Linux/i386 swap file (new style), version 1 (4K pages), size 261631 pages, no label, UUID=26f9a596-9727-48ed-b24a-820df9d028b8
```

# Werken met UUIDS

- /etc/fstab

```
student@ubserv:~$ sudo blkid
/dev/sda1: UUID="e5cdef95-7817-444b-b517-28b4b027c423" TYPE="ext4"
/dev/sda5: UUID="26f9a596-9727-48ed-b24a-820df9d028b8" TYPE="swap"
```

```
student@ubserv:~$ cat /etc/fstab
# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# <file system> <mount point> <type> <options>          <dump> <pass>
# / was on /dev/sda1 during installation
UUID=e5cdef95-7817-444b-b517-28b4b027c423 / ext4 errors=remount-ro 0 1
# swap was on /dev/sda5 during installation
UUID=26f9a596-9727-48ed-b24a-820df9d028b8 none swap sw 0 0
/dev/fd0 /media/floppy0 auto rw,user,noauto,exec,utf8 0 0
```

# Werken met UUIDS

- /boot/grub/grub.cfg

```
student@ubserv:~$ sudo blkid
/dev/sda1: UUID="e5cdef95-7817-444b-b517-28b4b027c423" TYPE="ext4"
/dev/sda5: UUID="26f9a596-9727-48ed-b24a-820df9d028b8" TYPE="swap"
```

```
student@ubserv:~$ grep -i uuid /boot/grub/grub.cfg
search --no-floppy --fs-uuid --set=root --hint-bios=hd0,msdos1 --hint-efi=hd0,msdos1 --hint-baremetal=ahci0,msdos1 e5cdef95-7817-444b-b517-444b-b027c423
search --no-floppy --fs-uuid --set=root e5cdef95-7817-444b-b517-28b4b027c423
  search --no-floppy --fs-uuid --set=root --hint-bios=hd0,msdos1 --hint-efi=hd0,msdos1 --hint-baremetal=ahci0,msdos1 e5cdef95-7817-444b-b027c423
  search --no-floppy --fs-uuid --set=root e5cdef95-7817-444b-b517-28b4b027c423
linux /boot/vmlinuz-3.13.0-32-generic root=UUID=e5cdef95-7817-444b-b517-28b4b027c423 ro splash vga=868 $vt_handoff
  search --no-floppy --fs-uuid --set=root --hint-bios=hd0,msdos1 --hint-efi=hd0,msdos1 --hint-baremetal=ahci0,msdos1 e5cdef95-7817-444b-b027c423
  search --no-floppy --fs-uuid --set=root e5cdef95-7817-444b-b517-28b4b027c423
linux /boot/vmlinuz-3.13.0-32-generic root=UUID=e5cdef95-7817-444b-b517-28b4b027c423 ro splash vga=868 $vt_handoff
  search --no-floppy --fs-uuid --set=root --hint-bios=hd0,msdos1 --hint-efi=hd0,msdos1 --hint-baremetal=ahci0,msdos1 e5cdef95-7817-444b-b027c423
  search --no-floppy --fs-uuid --set=root e5cdef95-7817-444b-b517-28b4b027c423
linux /boot/vmlinuz-3.13.0-32-generic root=UUID=e5cdef95-7817-444b-b517-28b4b027c423 ro recovery nomodeset
search --no-floppy --fs-uuid --set=root --hint-bios=hd0,msdos1 --hint-efi=hd0,msdos1 --hint-baremetal=ahci0,msdos1 e5cdef95-7817-444b-b027c423
search --no-floppy --fs-uuid --set=root e5cdef95-7817-444b-b517-28b4b027c423
search --no-floppy --fs-uuid --set=root --hint-bios=hd0,msdos1 --hint-efi=hd0,msdos1 --hint-baremetal=ahci0,msdos1 e5cdef95-7817-444b-b027c423
search --no-floppy --fs-uuid --set=root e5cdef95-7817-444b-b517-28b4b027c423
```