

# Estació de treball HP xw4400 per l'Avance III 400sb - Actualització al maig de 2017

Actualització de l'estació de treball [HP xw4400 de l'espectròmetre Bruker Avance III 400sb](#).

## Instal·lació de Debian GNU/Linux

La distribució de GNU/Linux que s'instal·la és la **Debian version 8.8.0**, released on May 6th, 2017, codenamed jessie, AMD64 architecture,

- [Debian "jessie" Release Information](#)
  - [AMD64 Port](#)
  - [Installing Debian 8.8](#)
- [Debian 8 -- Release Notes](#)

## Configuració inicial

- Language: English
- Country: Spain
- Locale: en\_US.UTF-8
- Keymap: Spanish
- Host name: cie-55-31 (configuració manual)
- Domain name: uab.es (configuració manual)
- User name:
  - sermnadmin (SeRMN-UAB Staff)
  - sermnuab (SeRMN-UAB Users) ⓘ es crearà més un cop completada la instal·lació
- Time zone: Madrid

## Partició del disc

Faig servir l'opció "Whole disk using LVM" que crea les següents particions al disc:

 esquema de particions: boot + LVM

```
LVM VG cie-55-31-vg, LV home as ext4
LVM VG cie-55-31-vg, LV root as ext4
LVM VG cie-55-31-vg, LV swap_1 as swap
LVM VG cie-55-31-vg, LV tmp as ext4
LVM VG cie-55-31-vg, LV var as ext4
partition #1 of SCSI3 (0,0,0) (sda) as ext2
```

amb la configuració del LVM:



```
Physical volume: /dev/sda3
Volume groups:  cie-55-31-vg
Logical volumes: home, root, swap_1, tmp, var
```




Un cop finalitzada la instal·lació, caldrà

- ajustar la mida dels volums lògics; i
- crear un volum lògic addicional */opt*

## Instal·lació i configuració inicial

### Instal·lació bàsica de programes

Les *col·leccions* de programes a instal·lar seleccionades són:

- Standard System
- Desktop Environment
  - Gnome
- SSH Server
- Web Server
- ...  comprovar `tasksel`

La resta de programes que poguessin ser necessaris, s'instal·laran més endavant.

### GRUB Boot Loader

GRUB Boot Loader s'instal·la al MBR.

### Reiniciar per primer cop

Un cop s'han instal·lat tots els paquets, reinicio l'ordinador i entro a la sessió de GNU/Debian Jessie.

## Simplificació de l'escriptori



Explicar la configuració final de l'escriptori, Gnome classic? per més informació consultar:

- <http://www.linuxquestions.org/questions/debian-26/how-can-i-enable-gnome-classic-in-jessie-4175543759/>
- <https://unix.stackexchange.com/questions/199932/different-look-and-feel-for-gnome-classic-in-debian-7-and-debian-8>



• ...

Simplifico l'escriptori:

- Elimino el panel inferior. Abans de fer-ho, moc els applets *Window List* i *Workspace Switcher* al panel superior.
- Elimino els applets *Notification Area* i *Window Selector* al panel superior, el primer perquè no vull que els usuaris enredin les connexions a la xarxa, i el segon perquè és redundant amb el *Window List*.
- Al *Workspace Switcher* redueixo el nombre d'escriptoris a 2. Els usuaris de MS-Windows no coneixen el concepte d'escriptoris i tenen tendència a perdre's.
- Canvio la configuració del *Workpsace Switcher*
  - Show windows from all workspaces
  - Group windows when space is limited
  - Restore to native workspace (les finestres minimitzades s'obren a l'escriptori on es van tancar)
- Afegeixo els applets *Lock Screen Button* per bloquejar la pantalla, i *Log Out Button* per sortir de la sessió o per canviar a un altre usuari.

Edito el menú per amagar les aplicacions que no vull que vegin els usuaris (jocs i altres entreteniments). Més endavant miraré d'esbrinar cóm es poden desinstal·lar algunes d'aquestes aplicacions innecessàries. Entre altres:

- L'usuari "normal" no hauria de veure el menú *System | Administration*
- L'usuari "normal" no hauria de veure moltes de les opcions disponibles al menú *System | Preferences*
- ...

## Paquets i programes de Debian

Afegeixo els següents paquets o programes (aquest no és un llistat exhaustiu, només inclou els dimonis i servidors de xarxa, i altres programes importants):

-  rsync
-  byobu (arrossega screen i tmux)

## Addició d'altres magatzems (repositories) de programes

Afegeixo altres magatzems (repositories) de programes:

-  deb <http://backports.debian.org/debian-backports/> jessie-backports main
-  deb <http://www.deb-multimedia.org/> jessie main contrib non-free

i la signatura (debian-multimedia-keyring) del magatzem *deb-multimedia*, i instal·lo:

-  Adobe Acrobat Reader


















També afegeixo el magatzem del navegador Chrome de Google:

-  deb <http://dl.google.com/linux/chrome/deb/> stable main


A la pàgina <https://sites.google.com/site/mydebiansourceslist/> es poden consultar altres magatzems disponibles.

## Altres paquets i programes de Debian






Afegeixo els següents paquets o programes (aquest no és un llistat exhaustiu, només inclou els dimonis i servidors de xarxa, i altres programes importants):

-  mc (midnight commander)
-  ftp-ssl en comptes de ftp
-  denyhosts
-  nfs-kernel-server
-  tftp-hpa
-  tftpd-hpa
-  bootparamd
-  isc-dhcp-server
-  xinetd (en comptes del programa per defecte: openbsd-inetd)
-  lshw i lshw-gtk
-  gsmartcontrol (instal·la smartmontools)
-  firefox-esr (extended support release)
-  chrome
-  apt-xapian-index (instal·la python-xapian)
-  firmware-linux (instal·la diversos paquets de firmware)
-  meld
-  cu (command used to call up another system and act as a dial in terminal. Part of UUCP but individually packaged)



Elimino els paquets o programes:

-  telnet
- ...


Elimino els següents metapackages per poder eliminar altres paquets o programes que depenen d'ells sense haver de desinstal·lar altres paquets que sí que m'interessen,

-  gnome
-  task-gnome-desktop
-  gnome-desktop-environment
-  gnome-office
-  gnome-documents

Llavors desinstal·lo:

-  gnome-games, gnome-games-data, gnome-games-extra-data
-  simple-scan
- ...

Substitueixo:

-  la versió lliure de Java (java-6-openjdk i paquets que en dependen) per la versió oficial (sun-java6-jdk i paquets que en depenen).

## Configuració de la xarxa

La connexió a la placa base s'identifica com a *eth1* i és una

```
Ethernet interface
/0/100/1c.5/0

product: NetXtreme BCM5755 Gigabit Ethernet PCI Express [14E4:167B]
vendor: Broadcom Corporation [14E4]
bus info: pci@0000:3f:00.0
logical name: eth1
version: 02
serial: 00:19:bb:57:96:9b
size: 100Mbit/s
capacity: 1Gbit/s
width: 64 bits
clock: 33MHz
capabilities:
    ...
    1Gbit/s,
    1Gbit/s (full duplex),
    Auto-negotiation
configuration:
    autonegotiation: on
    broadcast: yes
    driver: tg3
    driverversion: 3.137
    duplex: full
    firmware: 5755-v3.17
    latency: 0
    link: yes
    multicast: yes
    port: twisted pair
    speed: 100Mbit/s
resources:
    irq: 48
    memory: e0400000-e040ffff
```

i la targeta de xarxa addicional s'identifica com a *eth0* és una

```
Ethernet interface
/0/100/1c.4/0

product: NetXtreme BCM5751 Gigabit Ethernet PCI Express [14E4:1677]
```

```
vendor: Broadcom Corporation [14E4]
bus info: pci@0000:28:00.0
logical name: eth0
version: 21
serial: 00:10:18:27:55:de
size: 100Mbit/s
capacity: 1Gbit/s
width: 64 bits
clock: 33MHz
capabilities:
    ...
    1Gbit/s,
    1Gbit/s (full duplex),
    Auto-negotiation
configuration:
    autonegotiation: on
    broadcast: yes
    driver: tg3
    driverversion: 3.137
    duplex: full
    firmware: 5751-v3.58
    ip: 158.109.55.31
    latency: 0
    link: yes
    multicast: yes
    port: twisted pair
    speed: 100Mbit/s
resources:
    irq: 47
    memory: e0500000-e050ffff
    memory: e0510000-e051ffff
```

Comprovo que les targetes estiguin definides al fitxer `/etc/udev/rules.d/70-persistent-net.rules` per tal verificar que l'assignació de les targetes al sistema operatiu sigui estàtica i no hi hagi cap possibilitat de que canviï si es reinicia l'ordinador, de forma que la targeta a la placa base sigui sempre `eth1` i correspongui a la connexió a la consola (IPSO), i que la targeta addicional sigui sempre `eth0` i es faci servir per la connexió a la xarxa local (LAN).

```
root@cie-55-31:/etc/udev/rules.d# more 70-persistent-net.rules
# This file was automatically generated by the /lib/udev/write_net_rules
# program, run by the persistent-net-generator.rules rules file.
#
# You can modify it, as long as you keep each rule on a single
# line, and change only the value of the NAME= key.

# PCI device 0x14e4:0x1677 (tg3)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",
ATTR{address}=="00:10:18:27:55:de", ATTR{dev_id}=="0x0",
ATTR{type}=="1", KERNEL=="eth*", NAME="eth0"
```

```
# PCI device 0x14e4:0x167b (tg3)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",
ATTR{address}=="00:19:bb:57:96:9b", ATTR{dev_id}=="0x0",
ATTR{type}=="1", KERNEL=="eth*", NAME="eth1"
```

Alhora, la targeta de la xarxa UAB (eth0) és configura de forma estàtica per evitar que la caiguda de la xarxa afecti el funcionament de l'espectròmetre, i els paràmetres de configuració són,

- Hostname: cie-55-31
- Domain: uab.es
- IP address: 158.109.55.31
- Broadcast: 158.109.63.255
- Netmask: 255.255.240.0
- DNS:
  - domain uab.es
  - search uab.es
  - nameserver 158.109.0.9
  - nameserver 158.109.254.130
  - nameserver 158.109.0.1

El dispositiu *eth1* també caldrà configurar-ho de forma estàtica amb els paràmetres de connexió emprats actualment per la connexió de l'estació de treball a la consola.

## Paquets i programes de Debian



Cal decidir si es manté la configuració a través del programa *network-manager* o si es desinstal·la i es fa la configuració manual.

Com que la configuració de la xarxa és estàtica, per evitar problemes elimino,

- network-manager i network-manager-gnome, i
- isc-dhcp i isc-dhpc-common,

i instal·lo

- net-tools, i
- ifupdown-extra, que alhora arrossega els paquets
  - ethtools, i
  - iputils-arping
- wireshark

## Bibliografia

- [Network Configuration](#) a la wiki de Debian.
- [NetworkManager](#) a la wiki de Debian.
- [Chapter 5. Network setup](#), a *Debian Reference*, by Osamu Aoki.
- [Disable NetworkManager](#)

- ...

## Fitxers de configuració provissionals

Aquesta és la configuració de xarxa provissional emprada per la instal·lació i configuració del sistema operatiu i del programa TopSpin.

### **/etc/hosts**

```
127.0.0.1    localhost
127.0.1.1    cie-55-31.uab.es    cie-55-31
```

### **/etc/resolv.conf**

```
domain uab.es
search uab.es
nameserver 158.109.0.9
nameserver 158.109.254.130
nameserver 158.109.0.1
```

### **/etc/network/interfaces**

```
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# Ethernet interfaces are assigned to physical devices in a
# persistent way according to rules in file:
#
# /etc/udev/rules.d/70-persistent-net.rules
#
# Hence, each of eth0 and eth1 will **always** correspond to
# the same device. The configuration below assumes that,
#
# eth0 -> lan (internet)
# eth1 -> nmr (spectrometer ccu or ipso)
#
auto eth0 eth1

# LAN / INTERNET - Assigned to the primary network interface,
# which usually will be the motherboard integrated NIC.
#
iface eth0 inet static
    address 158.109.55.31
    netmask 255.255.240.0
```



```
broadcast 158.109.63.255
gateway 158.109.0.3

# NMR CONSOLE LAN - Assigned to the secondary network interface,
# which usually will be the added NIC.
#
iface eth1 inet static
    address 149.236.99.1
    netmask 255.255.255.0
    network 149.236.99.0
    broadcast 10.10.255.255
```

### **/etc/udev/rules.d/70-persistent-net.rules**

```
# This file was automatically generated by the /lib/udev/write_net_rules
# program, run by the persistent-net-generator.rules rules file.
#
# You can modify it, as long as you keep each rule on a single
# line, and change only the value of the NAME= key.

# PCI device 0x14e4:0x167b (tg3)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",
ATTR{address}=="00:10:18:27:55:de",
ATTR{dev_id}=="0x0", ATTR{type}=="1", KERNEL=="eth*", NAME="eth0"

# PCI device 0x14e4:0x1677 (tg3)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",
ATTR{address}=="00:19:bb:57:96:9b",
ATTR{dev_id}=="0x0", ATTR{type}=="1", KERNEL=="eth*", NAME="eth1"
```

## **Configuració de serveis**

### **Avahi**

Aturo i desactivo el servei amb les comandes

- `systemctl stop avahi-daemon` i `systemctl disable avahi-daemon`; i
- `systemctl stop avahi-daemon.socket` i `systemctl disable avahi-daemon.socket`

### **Trivial FTP daemon**



Enllaços sobre la configuració del *tftpd*

- <http://chschneider.eu/linux/server/tftpd-hpa.shtml>
- <http://diablo.craem.net/wordpress/?p=171>
- ...


## Bootparam

 Cal configurar-lo per servir el sistema operatiu de la consola.

## NFS

 Cal configurar-lo per servir el sistema operatiu de la consola.

## NTP

 Instal·lo el paquet *ntp* però no afegeixo cap servidor de temps i deixo la configuració per defecte que fa servir el pool de servidors de temps de Debian.

## Nous magatzems

He afegit nous magatzems (repositories) per tal de poder instal·lar programes addicionals o versions més noves d'alguns programes.

En primer lloc, em descarrego i afegeixo la clau del magatzem *Debian Mozilla*

```
# wget -O- -q http://mozilla.debian.net/archive.asc | gpg --import
# gpg --check-sigs --fingerprint --keyring /usr/share/keyrings/debian-
archive-keyring.gpg
# gpg --export -a 06C4AE2A | apt-key add -
```

i la clau del magatzem *Debian Multimedia*,

```
# aptitude install deb-multimedia-keyring
```

Després actualitzo el registres dels programes *apt-get* i *aptitude*

```
# apt-get update
# aptitude update
```

## Hardware especial

### Drivers per la targeta gràfica

Instal·lo els drivers més actuals disponibles a *debian-backports*.

Per més informació consultar:

- [http://wiki.debian.org/NvidiaGraphicsDrivers#non-free\\_drivers](http://wiki.debian.org/NvidiaGraphicsDrivers#non-free_drivers)
- <http://www.nvidia.com/object/unix.html>
- <http://www.nvidia.com/object/linux-display-amd64-290.10-driver.html>
- <http://packages.debian.org/search?keywords=nvidia-glx>
- ...

Per veure si es poden connectar dos monitors consultar:

- [http://en.gentoo-wiki.com/wiki/X.Org/Dual\\_Monitors/Nvidia](http://en.gentoo-wiki.com/wiki/X.Org/Dual_Monitors/Nvidia)
- [http://www.nvidia.com/object/feature\\_twinview.html](http://www.nvidia.com/object/feature_twinview.html)
- <http://ubuntuforums.org/showthread.php?t=1817622>
- <http://www.ublug.org/ubuntu/twinview/twinview-howto-breezy.html>
- <http://us.download.nvidia.com/solaris/96.43.21/README/appendix-g.html>
- [http://defindit.com/readme\\_files/x\\_windows\\_dual\\_monitor.html](http://defindit.com/readme_files/x_windows_dual_monitor.html)
- <http://forums.nvidia.com/>
- ...

## Drivers per la 2a targeta de xarxa

Aparentment no cal instal·lar cap driver especial ja que la targeta és suportada per GNU/Linux, però per si de cas, aquests són alguns enllaços relacionats amb aquest model de targeta:

- [linux driver dge-528t](#) a Google
- [Technical Support - DGE-528T - Copper Gigabit PCI Card for PC](#)
- [DGE-528T - Copper Gigabit PCI Card for PC](#)
- [Components supported by the r8169 module](#)

## Drivers per la targeta amb ports sèrie

La targeta és reconeguda i configurada pel sistema, no cal instal·lar cap controlador addicional,

```
[ 0.688353] Serial: 8250/16550 driver, 4 ports, IRQ sharing enabled
[ 0.688545]   alloc irq_desc for 16 on node -1
[ 0.688546]   alloc kstat_irqs on node -1
[ 0.688550] serial 0000:1c:00.0: PCI INT A -> GSI 16 (level, low) -> IRQ
16
[ 0.688562] 2 ports detected on Oxford PCI Express device
[ 0.688613] ttyS0: detected caps 00000700 should be 00000100
[ 0.688617] 0000:1c:00.0: ttyS0 at MMIO 0xec401000 (irq = 16) is a
16C950/954
[ 0.688670] ttyS1: detected caps 00000700 should be 00000100
[ 0.688674] 0000:1c:00.0: ttyS1 at MMIO 0xec401200 (irq = 16) is a
16C950/954
```

## Configuració de la BIOS



Quan tot estigui funcionant caldrà verificar la configuració de la BIOS, per exemple, per



protegir l'accés amb una contrasenya.

## Securing Debian GNU/Linux

- [Debian SELinux support](#). The Debian packaged Linux kernels have had SELinux support compiled in (but disabled by default) since version 2.6.9.
  - [SELinux Setup](#)
- [Security-Enhanced Linux](#)
- [SELinux Project Wiki](#)
- [SELINUX \(Security-Enhanced Linux\)](#)
- [Securing and Hardening Red Hat Linux Production Systems](#). A Practical Guide to Basic Linux Security in Production Enterprise Environments. Written by Werner Puschitz.

## Altres millores a Debian

### Devil's pie

- [Devil's Pie](#) is a window-matching utility, inspired by Sawfish's "Matched Windows" option and the lack of the functionality in Metacity. Metacity lacking window matching is not a bad thing — Metacity is a lean window manager, and window matching does not have to be a window manager task. Devil's Pie can be configured to detect windows as they are created, and match the window to a set of rules. If the window matches the rules, it can perform a series of actions on that window. For example, I can make all windows created by X-Chat appear on all workspaces, and the main Gkrellm1 window does not appear in the pager or task list.
- [Devilspie](#) is a non-gui utility that lets you make applications start in specified workplaces, in specified sizes and placements, minimized or maximized and much more based on simple config files.
- [GDevilspie](#) is a user friendly interface to the devilspie window matching daemon, to create rules easily.
  - [How do I tell a start up program to start minimized?](#)

### Teamviewer

- [TeamViewer](#) the All-In-One Solution for Remote Access and Support over the Internet. TeamViewer connects to any PC or server around the world within a few seconds. You can remote control your partner's PC as if you were sitting right in front of it.

## Configuració de GNOME

Consultar els següents enllaços sobre cómo millorar o personalitzar el comportament de Gnome

- [GNOME](#) at ArchLinux

- [GNOME Tips](#)
- [Configuring GDM 2.28](#)

## Gnome Shell Extensions

Segueixo les instruccions a [stackexchange.com](https://stackexchange.com) per poder instal·lar les següents extensions pel Gnome:

- [No Topleft Hot Corner](#)
- ...

## Instal·lació del TopSpin

- [Instal·lació del TopSpin 3.5 Pl 6](#)

## Transferència de dades

### Disc dur amb problemes

Provo a transferir les dades des de l'antic disc dur que ha donat problemes. Per començar, comprovo si es pot accedir a la taula de particions del disc vell,

```
sermnadmin@cie-55-31:~$ sudo sfdisk -l /dev/sdb
```

```
Disk /dev/sdb: 19457 cylinders, 255 heads, 63 sectors/track
sfdisk: Warning: extended partition does not start at a cylinder boundary.
DOS and Linux will interpret the contents differently.
Units: cylinders of 8225280 bytes, blocks of 1024 bytes, counting from 0
```

Device	Boot	Start	End	#cyls	#blocks	Id	System
/dev/sdb1	*	0+	2431-	2432-	19530752	83	Linux
/dev/sdb2		2431+	19457-	17026-	136757249	5	Extended
/dev/sdb3		0	-	0	0	0	Empty
/dev/sdb4		0	-	0	0	0	Empty
/dev/sdb5		2431+	3039-	608-	4881408	83	Linux
/dev/sdb6		3039+	4498-	1459-	11717632	82	Linux swap / Solaris
/dev/sdb7		4498+	6929-	2432-	19529728	83	Linux
/dev/sdb8		6929+	19457-	12528-	100625408	83	Linux

Llavors faig una còpia de seguretat de la taula de particions,

```
root@cie-55-31:/home/sermnadmin/Documents/old-hdd-recovery/partition-backup#
dd if=/dev/sdb of=backup-old-hdd.mbr count=1 bs=512
1+0 records in
1+0 records out
512 bytes (512 B) copied, 0.00115307 s, 444 kB/s
```

```
root@cie-55-31:/home/sermnadmin/Documents/old-hdd-recovery/partition-backup#
sfdisk -d /dev/sdb > backup-old-hdd.sf
sfdisk: Warning: extended partition does not start at a cylinder boundary.
DOS and Linux will interpret the contents differently.
root@cie-55-31:/home/sermnadmin/Documents/old-hdd-recovery/part
```

Finalment, provo a copiar amb [ddrescue](#) les particions `/dev/sdb5` (VAR), `/dev/sdb7` (OPT) i `/dev/sdb8` (HOME),

```
root@cie-55-31:/home/sermnadmin/Documents/old-hdd-recovery/sdb5-old-hdd-var#
ddrescue -d -r3 /dev/sdb5 sdb5.image sdb5.mapfile
GNU ddrescue 1.19
Press Ctrl-C to interrupt
rescued:      1179 kB,  errsize:      0 B,  current rate:    10922 B/s
  ipos:       1179 kB,  errors:       0,   average rate:    15521 B/s
  opos:       1179 kB,  run time:     1.26 m,  successful read:  0 s ago
Copying non-tried blocks... Pass 1 (forwards)
```



Per algun motiu, aquest procediment és molt lent. Després de provar diverses recomanacions trobades a Internet sense obtenir una millora substancial a la velocitat amb què es copien les dades, decideixo deixar-ho per més endavant i provar amb el disc anterior a aquest.

Serviria de res canvia la placa de control? <http://www.hdd-parts.com/13082508.html>

Un cop recuperades les dades del disc dur més antic, torno a provar a recuperar les del disc que amb problemes.

L'ordinador reconeix el disc i troba les particions esmentades més amunt

```
[167302.836024] usb 5-8: new high-speed USB device number 12 using ehci-pci
[167302.984889] usb 5-8: New USB device found, idVendor=152d, idProduct=2329
[167302.984895] usb 5-8: New USB device strings: Mfr=1, Product=2,
SerialNumber=5
[167302.984898] usb 5-8: Product: USB to ATA/ATAPI Bridge
[167302.984902] usb 5-8: Manufacturer: JMicron
[167302.984905] usb 5-8: SerialNumber: 56819FFFFFFF
[167302.985556] usb-storage 5-8:1.0: USB Mass Storage device detected
[167302.985724] usb-storage 5-8:1.0: Quirks match for vid 152d pid 2329:
8020
[167302.985758] scsi11 : usb-storage 5-8:1.0
[167307.111166] scsi 11:0:0:0: Direct-Access          ST316081 2AS
PQ: 0 ANSI: 2 CCS
[167307.111581] sd 11:0:0:0: Attached scsi generic sg2 type 0
[167308.435394] sd 11:0:0:0: [sdb] 312581808 512-byte logical blocks: (160
GB/149 GiB)
[167308.436640] sd 11:0:0:0: [sdb] Write Protect is off
```

```
[167308.436646] sd 11:0:0:0: [sdb] Mode Sense: 34 00 00 00
[167308.437632] sd 11:0:0:0: [sdb] Write cache: disabled, read cache:
enabled, doesn't support DPO or FUA
[167325.207247] sdb: sdb1 sdb2 < sdb5 sdb6 sdb7 sdb8 >
[167325.211102] sd 11:0:0:0: [sdb] Attached SCSI disk
[167527.620198] sd 11:0:0:0: [sdb] Unhandled sense code
[167527.620204] sd 11:0:0:0: [sdb]
```

però l'intent de fer servir la comanda partprobe dóna un munt d'errors com:

```
[167527.620207] Result: hostbyte=DID_OK driverbyte=DRIVER_SENSE
[167527.620210] sd 11:0:0:0: [sdb]
[167527.620213] Sense Key : Medium Error [current]
[167527.620217] sd 11:0:0:0: [sdb]
[167527.620220] Add. Sense: Unrecovered read error
[167527.620223] sd 11:0:0:0: [sdb] CDB:
[167527.620225] Read(10): 28 00 00 00 08 00 00 00 08 00
[167527.620235] end_request: critical medium error, dev sdb, sector 2048
[167527.620240] Buffer I/O error on device sdb, logical block 256
[167535.691059] sd 11:0:0:0: [sdb] Unhandled sense code
[167535.691066] sd 11:0:0:0: [sdb]
[167535.691069] Result: hostbyte=DID_OK driverbyte=DRIVER_SENSE
[167535.691072] sd 11:0:0:0: [sdb]
[167535.691074] Sense Key : Medium Error [current]
[167535.691079] sd 11:0:0:0: [sdb]
[167535.691082] Add. Sense: Unrecovered read error
[167535.691085] sd 11:0:0:0: [sdb] CDB:
[167535.691088] Read(10): 28 00 00 00 08 00 00 00 08 00
[167535.691098] end_request: critical medium error, dev sdb, sector 2048
[167535.691103] Buffer I/O error on device sdb, logical block 256
[167576.211102] sd 11:0:0:0: [sdb] Unhandled sense code
[167576.211109] sd 11:0:0:0: [sdb]
[167576.211111] Result: hostbyte=DID_OK driverbyte=DRIVER_SENSE
[167576.211114] sd 11:0:0:0: [sdb]
[167576.211117] Sense Key : Medium Error [current]
[167576.211121] sd 11:0:0:0: [sdb]
[167576.211124] Add. Sense: Unrecovered read error
[167576.211128] sd 11:0:0:0: [sdb] CDB:
[167576.211130] Read(10): 28 00 06 a2 c0 00 00 00 08 00
[167576.211140] end_request: critical medium error, dev sdb, sector
111329280
[167576.211146] Buffer I/O error on device sdb8, logical block 0
```

0

```
[168724.524020] usb 5-7: new high-speed USB device number 14 using ehci-pci
[168724.664870] usb 5-7: New USB device found, idVendor=152d, idProduct=2329
[168724.664876] usb 5-7: New USB device strings: Mfr=1, Product=2,
SerialNumber=5
[168724.664879] usb 5-7: Product: USB to ATA/ATAPI Bridge
[168724.664883] usb 5-7: Manufacturer: JMicron
```

```
[168724.664886] usb 5-7: SerialNumber: 801130168383
[168724.665536] usb-storage 5-7:1.0: USB Mass Storage device detected
[168724.665701] usb-storage 5-7:1.0: Quirks match for vid 152d pid 2329:
8020
[168724.665736] scsi13 : usb-storage 5-7:1.0
[168729.117271] scsi 13:0:0:0: Direct-Access
PQ: 0 ANSI: 2 CCS
[168729.117663] sd 13:0:0:0: Attached scsi generic sg2 type 0
[168759.413200] sd 13:0:0:0: [sdb] READ CAPACITY failed
[168759.413206] sd 13:0:0:0: [sdb]
[168759.413209] Result: hostbyte=DID_OK driverbyte=DRIVER_SENSE
[168759.413212] sd 13:0:0:0: [sdb]
[168759.413215] Sense Key : Unit Attention [current]
[168759.413220] sd 13:0:0:0: [sdb]
[168759.413224] Add. Sense: Not ready to ready change, medium may have
changed
[168764.942936] sd 13:0:0:0: [sdb] Test WP failed, assume Write Enabled
[168773.198053] sd 13:0:0:0: [sdb] Asking for cache data failed
[168773.198060] sd 13:0:0:0: [sdb] Assuming drive cache: write through
[168830.604440] sd 13:0:0:0: [sdb] READ CAPACITY failed
[168830.604445] sd 13:0:0:0: [sdb]
[168830.604447] Result: hostbyte=DID_OK driverbyte=DRIVER_SENSE
[168830.604449] sd 13:0:0:0: [sdb]
[168830.604451] Sense Key : Unit Attention [current]
[168830.604454] sd 13:0:0:0: [sdb]
[168830.604457] Add. Sense: Not ready to ready change, medium may have
changed
```

i el resultat d'executar la comanda `smartctl -a /dev/sdb` és,

```
root@cie-55-31:/home/sermnadmin/Documents/old-old-hdd-recovery# smartctl -a
/dev/sdb
smartctl 6.4 2014-10-07 r4002 [x86_64-linux-3.16.0-4-amd64] (local build)
Copyright (C) 2002-14, Bruce Allen, Christian Franke, www.smartmontools.org

=== START OF INFORMATION SECTION ===
Model Family:      Seagate Barracuda 7200.9
Device Model:      ST3160812AS
Serial Number:     5LS68H19
Firmware Version:  3.AHL
User Capacity:     160,041,885,696 bytes [160 GB]
Sector Size:       512 bytes logical/physical
Device is:         In smartctl database [for details use: -P show]
ATA Version is:    ATA/ATAPI-7 (minor revision not indicated)
Local Time is:     Fri May 19 16:26:32 2017 CEST
SMART support is:  Available - device has SMART capability.
SMART support is:  Enabled

=== START OF READ SMART DATA SECTION ===
```



SMART overall-health self-assessment test result: PASSED

General SMART Values:

Offline data collection status: (0x82) Offline data collection activity was completed without error.

Auto Offline Data Collection: Enabled.

Self-test execution status: ( 0) The previous self-test routine completed

without error or no self-test has ever been run.

Total time to complete Offline data collection: ( 433) seconds.

Offline data collection capabilities: (0x5b) SMART execute Offline immediate. Auto Offline data collection on/off support. Suspend Offline collection upon new command. Offline surface scan supported. Self-test supported. No Conveyance Self-test supported. Selective Self-test supported.

SMART capabilities: (0x0003) Saves SMART data before entering power-saving mode. Supports SMART auto save timer.

Error logging capability: (0x01) Error logging supported. General Purpose Logging supported.

Short self-test routine recommended polling time: ( 2) minutes.

Extended self-test routine recommended polling time: ( 54) minutes.

SCT capabilities: (0x0009) SCT Status supported. SCT Error Recovery Control supported.

SMART Attributes Data Structure revision number: 10

Vendor Specific SMART Attributes with Thresholds:

ID#	ATTRIBUTE_NAME	FLAG	VALUE	WORST	THRESH	TYPE	UPDATED
1	Raw_Read_Error_Rate	0x000f	100	253	006	Pre-fail	Always
-	0						
3	Spin_Up_Time	0x0002	094	094	000	Old_age	Always
-	0						
4	Start_Stop_Count	0x0033	100	100	020	Pre-fail	Always
-	71						
5	Reallocated_Sector_Ct	0x0033	100	100	036	Pre-fail	Always
-	37						
7	Seek_Error_Rate	0x000f	085	060	030	Pre-fail	Always
-	356768337						
9	Power_On_Hours	0x0032	021	021	000	Old_age	Always
-	69653						
10	Spin_Retry_Count	0x0013	100	100	097	Pre-fail	Always
-	0						

12	Power_Cycle_Count	0x0033	100	100	020	Pre-fail	Always
-	82						
187	Reported_Uncorrect	0x0032	068	068	000	Old_age	Always
-	32						
189	High_Fly_Writes	0x003a	100	100	000	Old_age	Always
-	0						
190	Airflow_Temperature_Cel	0x0022	063	063	045	Old_age	Always
-	37 (Min/Max 37/37)						
194	Temperature_Celsius	0x0022	037	040	000	Old_age	Always
-	37 (0 16 0 0 0)						
195	Hardware_ECC_Recovered	0x001a	102	048	000	Old_age	Always
-	124688544						
197	Current_Pending_Sector	0x0012	001	001	000	Old_age	Always
-	4403						
198	Offline_Uncorrectable	0x0010	001	001	000	Old_age	Offline
-	4403						
199	UDMA_CRC_Error_Count	0x003e	200	200	000	Old_age	Always
-	0						
200	Multi_Zone_Error_Rate	0x0000	100	253	000	Old_age	Offline
-	0						
202	Data_Address_Mark_Errs	0x0032	100	253	000	Old_age	Always
-	0						

SMART Error Log Version: 1

ATA Error Count: 167 (device log contains only the most recent five errors)

CR = Command Register [HEX]

FR = Features Register [HEX]

SC = Sector Count Register [HEX]

SN = Sector Number Register [HEX]

CL = Cylinder Low Register [HEX]

CH = Cylinder High Register [HEX]

DH = Device/Head Register [HEX]

DC = Device Command Register [HEX]

ER = Error register [HEX]

ST = Status register [HEX]

Powered\_Up\_Time is measured from power on, and printed as

DDd+hh:mm:SS.sss where DD=days, hh=hours, mm=minutes,

SS=sec, and sss=millisec. It "wraps" after 49.710 days.

Error 167 occurred at disk power-on lifetime: 4117 hours (171 days + 13 hours)

When the command that caused the error occurred, the device was active or idle.

After command completion occurred, registers were:

ER ST SC SN CL CH DH

-- -- -- -- -- -- --

40 51 00 00 08 00 e0 Error: UNC at LBA = 0x00000800 = 2048

```

Commands leading to the command that caused the error were:
CR FR SC SN CL CH DH DC    Powered_Up_Time  Command/Feature_Name
-- -- -- -- -- -- -- --  -
25 00 08 00 08 00 e0 00    00:06:38.518  READ DMA EXT
25 00 08 18 b8 4e e0 00    00:06:38.516  READ DMA EXT
25 00 08 00 c0 4e e0 00    00:06:38.502  READ DMA EXT
25 00 08 18 18 e9 e0 00    00:06:34.538  READ DMA EXT
25 00 08 f8 0e e9 e0 00    00:06:30.491  READ DMA EXT

```

Error 166 occurred at disk power-on lifetime: 4117 hours (171 days + 13 hours)

When the command that caused the error occurred, the device was active or idle.

```

After command completion occurred, registers were:
ER ST SC SN CL CH DH
-- -- -- -- -- -- --
40 51 00 00 08 00 e0  Error: UNC at LBA = 0x00000800 = 2048

```

```

Commands leading to the command that caused the error were:
CR FR SC SN CL CH DH DC    Powered_Up_Time  Command/Feature_Name
-- -- -- -- -- -- -- --  -
25 00 08 00 08 00 e0 00    00:06:38.518  READ DMA EXT
ef 03 45 00 00 00 a0 00    00:06:38.516  SET FEATURES [Set transfer
mode]
00 00 08 00 00 00 00 04    00:06:38.502  NOP [Abort queued commands]
25 00 08 00 08 00 e0 00    00:06:34.538  READ DMA EXT
25 00 08 f8 b6 a2 e0 00    00:06:30.491  READ DMA EXT

```

Error 165 occurred at disk power-on lifetime: 4117 hours (171 days + 13 hours)

When the command that caused the error occurred, the device was active or idle.

```

After command completion occurred, registers were:
ER ST SC SN CL CH DH
-- -- -- -- -- -- --
40 51 00 00 08 00 e0  Error: UNC at LBA = 0x00000800 = 2048

```

```

Commands leading to the command that caused the error were:
CR FR SC SN CL CH DH DC    Powered_Up_Time  Command/Feature_Name
-- -- -- -- -- -- -- --  -
25 00 08 00 08 00 e0 00    00:05:58.830  READ DMA EXT
25 00 08 f8 b6 a2 e0 00    00:05:54.874  READ DMA EXT
25 00 10 f8 b7 a2 e0 00    00:05:50.836  READ DMA EXT
25 00 08 f8 ae 4e e0 00    00:06:34.538  READ DMA EXT
25 00 08 f8 af 4e e0 00    00:06:30.491  READ DMA EXT

```

Error 164 occurred at disk power-on lifetime: 4117 hours (171 days + 13 hours)

When the command that caused the error occurred, the device was active or

idle.

After command completion occurred, registers were:

ER ST SC SN CL CH DH

-- -- -- -- -- -- --

40 51 00 00 08 00 e0 Error: UNC at LBA = 0x00000800 = 2048

Commands leading to the command that caused the error were:

CR FR SC SN CL CH DH DC Powered\_Up\_Time Command/Feature\_Name

-- -- -- -- -- -- -- -----

25 00 08 00 08 00 e0 00 00:05:58.830 READ DMA EXT

25 00 08 00 b0 4e e0 00 00:05:54.874 READ DMA EXT

ef 03 45 00 00 00 a0 00 00:05:50.836 SET FEATURES [Set transfer mode]

00 00 08 00 00 00 00 04 00:05:46.773 NOP [Abort queued commands]

25 00 08 00 08 00 e0 00 00:05:46.726 READ DMA EXT

Error 163 occurred at disk power-on lifetime: 4117 hours (171 days + 13 hours)

When the command that caused the error occurred, the device was active or idle.

After command completion occurred, registers were:

ER ST SC SN CL CH DH

-- -- -- -- -- -- --

40 51 00 00 08 00 e0 Error: UNC at LBA = 0x00000800 = 2048

Commands leading to the command that caused the error were:

CR FR SC SN CL CH DH DC Powered\_Up\_Time Command/Feature\_Name

-- -- -- -- -- -- -- -----

25 00 08 00 08 00 e0 00 00:05:13.529 READ DMA EXT

25 00 08 08 b8 4e e0 00 00:05:54.874 READ DMA EXT

25 00 08 00 b8 4e e0 00 00:05:50.836 READ DMA EXT

ef 03 45 00 00 00 a0 00 00:05:46.773 SET FEATURES [Set transfer mode]

00 00 08 00 00 00 00 04 00:05:46.726 NOP [Abort queued commands]

SMART Self-test log structure revision number 1

Num	Test_Description	Status	Remaining	LifeTime(hours)
-----	------------------	--------	-----------	-----------------

LBA_of_first_error				
--------------------	--	--	--	--

# 1	Short offline	Completed without error	00%	0
-----	---------------	-------------------------	-----	---

-

SMART Selective self-test log data structure revision number 1

SPAN	MIN_LBA	MAX_LBA	CURRENT_TEST_STATUS
------	---------	---------	---------------------

1	0	0	Not_testing
---	---	---	-------------

2	0	0	Not_testing
---	---	---	-------------

3	0	0	Not_testing
---	---	---	-------------

4	0	0	Not_testing
---	---	---	-------------





```

"\3310\3320\3330\3340\3350\3360\3370\3400\3410\3420\3430\3440\3450\3460\3470
\3500"... , 512) = 512
lseek(3, 37000052736, SEEK_SET)          = 37000052736
read(3,
"\17\377\0\0\330\315\0\0\t\233\0\0\303c\0\0`&\0\0\30\347\377\377\244\253\377
\377\217s\377\377"... , 512) = 512
lseek(3, 56999542784, SEEK_SET)        = 56999542784
read(3,
"9\246\f\0'0\5\0\232\n\1\0\356\223\6\0\236\307\n\0\360\226\1\0z?\363\377\222
\303\355\377"... , 512) = 512
write(1, "Units: cylinders of 8225280 byte"... , 74Units: cylinders of
8225280 bytes, blocks of 1024 bytes, counting from 0

) = 74
write(1, "  Device Boot Start      End  #"... , 61  Device Boot Start
End  #cyls  #blocks  Id System
) = 61
write(1, "/dev/sdb1 *          0+  2431-  "... , 60/dev/sdb1 *          0+
2431-  2432-  19530752  83  Linux
) = 60
write(1, "/dev/sdb2          2431+  19457-  1"... , 63/dev/sdb2          2431+
19457-  17026-  136757249  5  Extended
) = 63
write(1, "/dev/sdb3          0          -  "... , 60/dev/sdb3          0
-          0          0  0  Empty
) = 60
write(1, "/dev/sdb4          0          -  "... , 60/dev/sdb4          0
-          0          0  0  Empty
) = 60
write(1, "/dev/sdb5          2431+  3039-  "... , 60/dev/sdb5          2431+
3039-  608-  4881408  83  Linux
) = 60
write(1, "/dev/sdb6          3039+  4498-  "... , 75/dev/sdb6          3039+
4498-  1459-  11717632  82  Linux swap / Solaris
) = 75
write(1, "/dev/sdb7          4498+  6929-  "... , 60/dev/sdb7          4498+
6929-  2432-  19529728  83  Linux
) = 60
write(1, "/dev/sdb8          6929+  19457-  1"... , 60/dev/sdb8          6929+
19457-  12528-  100625408  83  Linux
) = 60
close(3)                                = 0
close(1)                                = 0
munmap(0x7f7386211000, 4096)            = 0
close(2)                                = 0
exit_group(0)                            = ?
+++ exited with 0 +++

```

## Disc dur anterior

Com que vaig guardar el disc anterior al disc que ha fallat ara, provo a muntar-ho i a recuperar els fitxers de configuració del TopSpin i els fitxers de dades que conté.

Comprovo que es pugui llegir la taula de particions del disc

```
root@cie-55-31:/media/sermnadmin/_opt1# sfdisk -l /dev/sdb
```

```
Disk /dev/sdb: 19457 cylinders, 255 heads, 63 sectors/track  
Units: cylinders of 8225280 bytes, blocks of 1024 bytes, counting from 0
```

Device	Boot	Start	End	#cyls	#blocks	Id	System
/dev/sdb1	*	0+	15	16-	128488+	83	Linux
/dev/sdb2		16	2055	2040	16386300	83	Linux
/dev/sdb3		2056	3075	1020	8193150	82	Linux swap / Solaris
/dev/sdb4		3076	19456	16381	131580382+	83	Linux

i resulta que l'ordinador reconeix i munta automàticament les particions *sdb1* (BOOT), *sdb2* (ROOT & HOME), i *sdb4* (OPT), de forma que puc copiar el seu contingut amb la comanda `rsync`. Les còpies es guarden provisionalment a les carpetes:

- /home/sermnuab/Documents/old-old-hdd-recovery/sdb2-old-old-hdd-root\_and\_home
- /home/sermnuab/Documents/old-old-hdd-recovery/sdb4-old-old-hdd-opt

i inclouen els directoris:

- /etc (71 MB)
- /home (147 MB)
- /usr/local (3.1 MB)
- /opt/topspin/data, conf, exp, nmr\_backup, i prog/au (871 MB)
- /opt/topspin21p15/data, conf, exp, nmr\_backup, i prog/au (871 MB)
- /opt/BASH (451 MB)
- /opt/sermn-uab (ca 85 GB) **!** **conté les dades de rmn**

Aquest és el resum del procés de còpia de les dades de rmn,

```
root@cie-55-31:/home/sermnadmin/Documents/old-old-hdd-recovery/sdb4-old-old-hdd-opt# rsync -Haxv --progress --stats /media/sermnadmin/_opt1/sermn-uab .  
:  
:  
Number of files: 1,245,349 (reg: 1,048,377, dir: 196,972)  
Number of created files: 1,245,349 (reg: 1,048,377, dir: 196,972)  
Number of deleted files: 0  
Number of regular files transferred: 1,048,377  
Total file size: 85,823,932,533 bytes  
Total transferred file size: 85,823,932,533 bytes  
Literal data: 85,823,932,533 bytes  
Matched data: 0 bytes
```



```
File list size: 4,915,042
File list generation time: 0.001 seconds
File list transfer time: 0.000 seconds
Total bytes sent: 85,909,483,467
Total bytes received: 21,165,285

sent 85,909,483,467 bytes  received 21,165,285 bytes  12,098,648.19
bytes/sec
total size is 85,823,932,533  speedup is 1.00
```

## Bibliografia

- [GNU ddrescue](#) - Data recovery tool
  - [GNU ddrescue Manual](#)
- [Guide to Using DDRescue to Recover Data](#)
- [TestDisk](#) is powerful free data recovery software.
  - [TestDisk Step By Step](#)

## Canvis a les particions



Cal estudiar la conveniència de moure la carpeta `/opt` a una partició separada.

## Bloqueig dels ports USB

Per evitar que els usuaris facin ús dels ports USB per connectar pendrives o discos externs, o del lector de CD/DVD, edito el fitxer `/etc/group` i els bloquejo l'accés eliminant l'usuari `sermnub` dels grups `cdrom` i `plugdev`.

## Impressora en PDF

Instal·lo el paquet `printer-driver-cups-pdf` per crear una impressora virtual en fitxers PDF. Això fa que s'instal·li el gestor d'impressió [CUPS](#) i que a la llista d'impressores surtin les que troba a la xarxa. Per eliminar-les desactivo el servei de descoberta d'impressores:

```
sermnadmin@cie-55-31:~$ sudo systemctl stop cups-browsed.service
[sudo] password for sermnadmin:
sermnadmin@cie-55-31:~$ sudo systemctl disable cups-browsed.service
Synchronizing state for cups-browsed.service with SysVinit using update-rc.d...
Executing /usr/sbin/update-rc.d cups-browsed defaults
Executing /usr/sbin/update-rc.d cups-browsed disable
insserv: warning: current start runlevel(s) (empty) of script `cups-browsed'
```

```
overrides LSB defaults (2 3 4 5).
insserv: warning: current stop runlevel(s) (0 1 2 3 4 5 6) of script `cups-
browsed' overrides LSB defaults (0 1 6).
sermnadmin@cie-55-31:~$ sudo systemctl status cups-browsed.service
● cups-browsed.service - Make remote CUPS printers available locally
   Loaded: loaded (/lib/systemd/system/cups-browsed.service; disabled)
   Active: inactive (dead)

May 31 12:47:30 cie-55-31 systemd[1]: Starting Make remote CUPS printers
available locally...
May 31 12:47:30 cie-55-31 systemd[1]: Started Make remote CUPS printers
available locally.
May 31 12:56:32 cie-55-31 systemd[1]: Stopping Make remote CUPS printers
available locally...
May 31 12:56:32 cie-55-31 systemd[1]: Stopped Make remote CUPS printers
available locally.
```

i les impressores de xarxa desapareixen i només queda la impressora virtual local.



La impressió des de la pestanya *plot* del TopSpin dona un error,

```
Printing has been cancelled:
java.awt.print.PrinterIOException
(Original message = Printing has been cancelled:
java.awt.print.PrinterIOException)

=====
31 May 2017 13:12:06.490 +0200
Topspin Version = 3.5 pl 6 (of August 4 2016), build 1784
JVM Version      = 1.8.0_102 (32 bit) Oracle Corporation
JVM Total memory = 110 MB
JVM Free  memory = 42 MB

java.lang.Exception: Stack trace
    at
    bruker.bio.topspin.bfw.gui.warn.AbstractMessage.getDetailsString(A
bstractMessage.java:827)
    at
    bruker.bio.topspin.bfw.gui.warn.AbstractMessage.setMsgSource(Abstr
actMessage.java:790)
    at
    bruker.bio.topspin.bfw.gui.warn.AbstractMessage.<init>(AbstractMes
sage.java:774)
    at de.bruker.nmr.mfw.base.BWarning.<init>(BWarning.java:102)
    at de.bruker.nmr.mfw.base.BError.<init>(BError.java:93)
    at de.bruker.nmr.mfw.base.BError.<init>(BError.java:72)
    at
    de.bruker.nmr.pr.plot.media.MediaFactory.doPrint(MediaFactory.java
```



```
:583)
  at
de.bruker.nmr.pr.plot.LayoutEditor$PlotPreviewHelperThread.run(LayoutEditor.java:1059)
```

Per trobar una solució, consultar els enllaços:



- <https://docs.oracle.com/javase/7/docs/api/java/awt/print/PrinterIOException.html>
- <https://stackoverflow.com/questions/17694722/java-awt-print-printerexception-printer-is-not-accepting-job>
- <http://copy-con.blogspot.com.es/2009/12/printer-is-not-accepting-job.html>
- [https://www.questarter.com/q/java-printing-with-cups-printers-not-found-3\\_860495.html](https://www.questarter.com/q/java-printing-with-cups-printers-not-found-3_860495.html)
- <https://www.experts-exchange.com/questions/28406389/Custom-VKP80-Printer-is-not-printing-anything-at-all.html>
- <http://www.cups-pdf.de>
- ...

## Nautilus scripts



Decidir si s'instal·len i, en tot cas, quins s'instal·len:

- <https://packages.debian.org/jessie/nautilus-scripts-manager>
- <https://help.ubuntu.com/community/NautilusScriptsHowto>
- <http://g-scripts.sourceforge.net/>

From: <https://sermn.uab.cat/wiki/> - **SeRMN Wiki**

Permanent link: [https://sermn.uab.cat/wiki/doku.php?id=informatica:hp\\_xw4400\\_400sb\\_upgrade\\_2017](https://sermn.uab.cat/wiki/doku.php?id=informatica:hp_xw4400_400sb_upgrade_2017)

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