

Version : **2022.01**

Dernière mise-à-jour : 2023/02/15 15:57

# LCF310 - Gestion du Noyau et des Quotas

## Contenu du Module

- **LCF310 - Gestion du Noyau et des Quotas**
  - Contenu du Module
  - Rôle du noyau
  - Compilation et installation du noyau et des modules
    - Déplacer /home
    - Créer un Nouveau Noyau
    - Préparer l'Arborescence Source du Noyau
    - Paramétrage du noyau
    - Compiler le Noyau
    - Installer le Nouveau Noyau
  - Gestion des Quotas
    - La Commande quotacheck
    - La Commande edquota
    - La Commande quotaon
    - La Commande repquota
    - La Commande quota
    - La Commande warnquota

## Rôle du noyau

Le noyau ou *kernel* est la partie du système d'exploitation qui gère les entrées/sorties avec des périphériques. Dans certains cas il est préférable de recompiler le noyau de Linux. La motivation de cette recompilation peut être :

---

- la diminution de la taille du noyau,
- la prise en charge de nouveau matériel,
- l'ajout de fonctionnalités,
- l'optimisation du code,
- la correction de bogues,
- le besoin d'une fonctionnalité expérimentale.

Commencez par identifier le noyau utilisé par votre machine :

```
[root@centos7 ~]# uname -r
3.10.0-327.13.1.el7.x86_64
```

Dans le cas d'une utilisation courante de Linux, il est cependant préférable de faire appel aux **modules**. Les modules se trouvent dans le répertoire **/lib/modules/<version-du-noyau>** :

```
[root@centos7 ~]# ls /lib/modules/`uname -r`/
build  modules.alias      modules.builtin    modules.dep.bin    modules.modesetting modules.softdep     source
weak-updates
extra  modules.alias.bin  modules.builtin.bin modules.devname     modules.networking  modules.symbols
updates
kernel modules.block      modules.dep        modules.drm         modules.order       modules.symbols.bin vdso
```

Les commandes pour manipuler les modules sont :

- insmod
- rmmod
- lsmod
- modprobe

Par exemple :

```
[root@centos7 ~]# lsmod
Module                Size  Used by
ip6t_rpfilter         12546  1
```

|                   |        |   |                                                                                 |
|-------------------|--------|---|---------------------------------------------------------------------------------|
| ip6t_REJECT       | 12939  | 2 |                                                                                 |
| ipt_REJECT        | 12541  | 2 |                                                                                 |
| xt_conntrack      | 12760  | 9 |                                                                                 |
| ebtable_nat       | 12807  | 0 |                                                                                 |
| ebtable_broute    | 12731  | 0 |                                                                                 |
| bridge            | 119562 | 1 | ebtable_broute                                                                  |
| stp               | 12976  | 1 | bridge                                                                          |
| llc               | 14552  | 2 | stp,bridge                                                                      |
| ebtable_filter    | 12827  | 0 |                                                                                 |
| ebtables          | 30913  | 3 | ebtable_broute,ebtable_nat,ebtable_filter                                       |
| ip6table_nat      | 12864  | 1 |                                                                                 |
| nf_conntrack_ipv6 | 18738  | 6 |                                                                                 |
| nf_defrag_ipv6    | 34768  | 1 | nf_conntrack_ipv6                                                               |
| nf_nat_ipv6       | 14131  | 1 | ip6table_nat                                                                    |
| ip6table_mangle   | 12700  | 1 |                                                                                 |
| ip6table_security | 12710  | 1 |                                                                                 |
| ip6table_raw      | 12683  | 1 |                                                                                 |
| ip6table_filter   | 12815  | 1 |                                                                                 |
| ip6_tables        | 27025  | 5 | ip6table_filter,ip6table_mangle,ip6table_security,ip6table_nat,ip6table_raw     |
| iptable_nat       | 12875  | 1 |                                                                                 |
| nf_conntrack_ipv4 | 14862  | 5 |                                                                                 |
| nf_defrag_ipv4    | 12729  | 1 | nf_conntrack_ipv4                                                               |
| nf_nat_ipv4       | 14115  | 1 | iptable_nat                                                                     |
| nf_nat            | 26146  | 2 | nf_nat_ipv4,nf_nat_ipv6                                                         |
| nf_conntrack      | 105745 | 6 | nf_nat,nf_nat_ipv4,nf_nat_ipv6,xt_conntrack,nf_conntrack_ipv4,nf_conntrack_ipv6 |
| iptable_mangle    | 12695  | 1 |                                                                                 |
| iptable_security  | 12705  | 1 |                                                                                 |
| iptable_raw       | 12678  | 1 |                                                                                 |
| iptable_filter    | 12810  | 1 |                                                                                 |
| dm_mirror         | 22135  | 0 |                                                                                 |
| dm_region_hash    | 20862  | 1 | dm_mirror                                                                       |
| dm_log            | 18411  | 2 | dm_region_hash,dm_mirror                                                        |
| dm_mod            | 113292 | 2 | dm_log,dm_mirror                                                                |
| crc32_pclmul      | 13113  | 0 |                                                                                 |

|                     |        |   |                                                                             |
|---------------------|--------|---|-----------------------------------------------------------------------------|
| ghash_clmulni_intel | 13259  | 0 |                                                                             |
| aesni_intel         | 69884  | 0 |                                                                             |
| lrw                 | 13286  | 1 | aesni_intel                                                                 |
| gf128mul            | 14951  | 1 | lrw                                                                         |
| glue_helper         | 13990  | 1 | aesni_intel                                                                 |
| snd_intel8x0        | 38274  | 1 |                                                                             |
| ablk_helper         | 13597  | 1 | aesni_intel                                                                 |
| cryptd              | 20359  | 3 | ghash_clmulni_intel,aesni_intel,ablk_helper                                 |
| snd_ac97_codec      | 130605 | 1 | snd_intel8x0                                                                |
| ac97_bus            | 12730  | 1 | snd_ac97_codec                                                              |
| ppdev               | 17671  | 0 |                                                                             |
| snd_seq             | 66691  | 0 |                                                                             |
| snd_seq_device      | 14356  | 1 | snd_seq                                                                     |
| snd_pcm             | 105835 | 2 | snd_ac97_codec,snd_intel8x0                                                 |
| pcspkr              | 12718  | 0 |                                                                             |
| sg                  | 40721  | 0 |                                                                             |
| parport_pc          | 28165  | 0 |                                                                             |
| parport             | 42348  | 2 | ppdev,parport_pc                                                            |
| snd_timer           | 29639  | 2 | snd_pcm,snd_seq                                                             |
| snd                 | 83425  | 8 | snd_ac97_codec,snd_intel8x0,snd_timer,snd_pcm,snd_seq,snd_seq_device        |
| soundcore           | 15047  | 1 | snd                                                                         |
| i2c_piix4           | 22106  | 0 |                                                                             |
| video               | 24400  | 0 |                                                                             |
| i2c_core            | 40582  | 1 | i2c_piix4                                                                   |
| nfsd                | 302418 | 1 |                                                                             |
| auth_rpcgss         | 59343  | 1 | nfsd                                                                        |
| nfs_acl             | 12837  | 1 | nfsd                                                                        |
| lockd               | 93600  | 1 | nfsd                                                                        |
| grace               | 13295  | 2 | nfsd,lockd                                                                  |
| sunrpc              | 300464 | 7 | nfsd,auth_rpcgss,lockd,nfs_acl                                              |
| ip_tables           | 27240  | 5 | iptables_security,iptables_filter,iptables_mangle,iptables_nat,iptables_raw |
| xfs                 | 939662 | 2 |                                                                             |
| libcrc32c           | 12644  | 1 | xfs                                                                         |
| sd_mod              | 45497  | 4 |                                                                             |

|                   |        |   |                                               |
|-------------------|--------|---|-----------------------------------------------|
| crc_t10dif        | 12714  | 1 | sd_mod                                        |
| crct10dif_generic | 12647  | 0 |                                               |
| sr_mod            | 22416  | 0 |                                               |
| cdrom             | 42556  | 1 | sr_mod                                        |
| ata_generic       | 12910  | 0 |                                               |
| pata_acpi         | 13038  | 0 |                                               |
| ahci              | 29907  | 3 |                                               |
| libahci           | 32031  | 1 | ahci                                          |
| ata_piix          | 35038  | 0 |                                               |
| crct10dif_pclmul  | 14289  | 1 |                                               |
| crct10dif_common  | 12595  | 3 | crct10dif_pclmul,crct10dif_generic,crc_t10dif |
| crc32c_intel      | 22079  | 1 |                                               |
| serio_raw         | 13462  | 0 |                                               |
| libata            | 218730 | 5 | ahci,pata_acpi,libahci,ata_generic,ata_piix   |
| e1000             | 149323 | 0 |                                               |

Pour ajouter un module, on peut utiliser la commande **insmod** ou **modprobe**. Cette dernière ajoute non seulement le module passé en argument mais également ses dépendances :

```
[root@centos7 ~]# modprobe bonding
[root@centos7 ~]# lsmod | more
Module                Size  Used by
bonding                136705  0
ip6t_rpfilter         12546   1
ip6t_REJECT           12939   2
ipt_REJECT             12541   2
xt_conntrack          12760   9
ebtable_nat           12807   0
ebtable_broute        12731   0
bridge                119562  1 ebtable_broute
stp                   12976   1 bridge
llc                   14552   2 stp,bridge
ebtable_filter        12827   0
ebtables              30913   3 ebtable_broute,ebtable_nat,ebtable_filter
```

```

ip6table_nat      12864  1
nf_conntrack_ipv6 18738  6
nf_defrag_ipv6    34768  1 nf_conntrack_ipv6
nf_nat_ipv6       14131  1 ip6table_nat
ip6table_mangle   12700  1
ip6table_security 12710  1
ip6table_raw      12683  1
ip6table_filter   12815  1
ip6_tables        27025  5 ip6table_filter,ip6table_mangle,ip6table_securit
y,ip6table_nat,ip6table_raw
--More--

```

Pour supprimer un module, on peut utiliser la commande **rmmod** ou **modprobe -r**. Cette dernière essaie de supprimer les dépendances non-utilisées :

```

[root@centos7 ~]# modprobe -r bonding
[root@centos7 ~]# lsmod | more
Module                Size  Used by
ip6t_rpfilter         12546  1
ip6t_REJECT           12939  2
ipt_REJECT            12541  2
xt_conntrack          12760  9
ebtable_nat           12807  0
ebtable_broute        12731  0
bridge               119562  1 ebtable_broute
stp                   12976  1 bridge
llc                   14552  2 stp,bridge
ebtable_filter        12827  0
ebtables              30913  3 ebtable_broute,ebtable_nat,ebtable_filter
ip6table_nat          12864  1
nf_conntrack_ipv6     18738  6
nf_defrag_ipv6        34768  1 nf_conntrack_ipv6
nf_nat_ipv6           14131  1 ip6table_nat
ip6table_mangle       12700  1
ip6table_security     12710  1

```

```

ip6table_raw          12683  1
ip6table_filter        12815  1
ip6_tables             27025  5 ip6table_filter,ip6table_mangle,ip6table_securit
y,ip6table_nat,ip6table_raw
iptables_nat           12875  1
--More--

```

Les dépendances des modules sont résolues par la commande **modprobe** grâce aux fichier **/lib/modules/<version-du-noyau>/modules.dep**. Ce dernier peut être créé manuellement grâce à la commande **depmod** :

```

[root@centos7 ~]# more /lib/modules/`uname -r`/modules.dep
kernel/arch/x86/kernel/cpu/mcheck/mce-inject.ko:
kernel/arch/x86/kernel/test_nx.ko:
kernel/arch/x86/crypto/ablk_helper.ko: kernel/crypto/cryptd.ko
kernel/arch/x86/crypto/glue_helper.ko:
kernel/arch/x86/crypto/camellia-x86_64.ko: kernel/crypto/xts.ko kernel/crypto/lrw.ko kernel/crypto/gf128mul.ko
kernel/arch/x86/crypto/glue_helper.ko
kernel/arch/x86/crypto/blowfish-x86_64.ko: kernel/crypto/blowfish_common.ko
kernel/arch/x86/crypto/twofish-x86_64.ko: kernel/crypto/twofish_common.ko
kernel/arch/x86/crypto/twofish-x86_64-3way.ko: kernel/arch/x86/crypto/twofish-x86_64.ko
kernel/crypto/twofish_common.ko kernel/crypto/xts.ko kernel/cryp
to/lrw.ko kernel/crypto/gf128mul.ko kernel/arch/x86/crypto/glue_helper.ko
kernel/arch/x86/crypto/salsa20-x86_64.ko:
kernel/arch/x86/crypto/serpent-sse2-x86_64.ko: kernel/crypto/xts.ko kernel/crypto/serpent_generic.ko
kernel/crypto/lrw.ko kernel/crypto/gf128mul.ko kern
el/arch/x86/crypto/glue_helper.ko kernel/arch/x86/crypto/ablk_helper.ko kernel/crypto/cryptd.ko
kernel/arch/x86/crypto/aesni-intel.ko: kernel/crypto/lrw.ko kernel/crypto/gf128mul.ko
kernel/arch/x86/crypto/glue_helper.ko kernel/arch/x86/crypto/ablk_
helper.ko kernel/crypto/cryptd.ko
kernel/arch/x86/crypto/ghash-clmulni-intel.ko: kernel/crypto/cryptd.ko
kernel/arch/x86/crypto/crc32c-intel.ko:
kernel/arch/x86/crypto/sha-mb/sha1-mb.ko: kernel/crypto/mcryptd.ko
kernel/arch/x86/crypto/crc32-pclmul.ko:
kernel/arch/x86/crypto/sha512-ssse3.ko: kernel/crypto/sha512_generic.ko

```

```
kernel/arch/x86/crypto/crct10dif-pclmul.ko: kernel/crypto/crct10dif_common.ko
kernel/arch/x86/crypto/camellia-aesni-avx-x86_64.ko: kernel/arch/x86/crypto/camellia-x86_64.ko
kernel/crypto/xts.ko kernel/crypto/lrw.ko kernel/crypto/g
f128mul.ko kernel/arch/x86/crypto/glue_helper.ko kernel/arch/x86/crypto/ablk_helper.ko kernel/crypto/cryptd.ko
kernel/arch/x86/crypto/cast5-avx-x86_64.ko: kernel/crypto/cast5_generic.ko kernel/crypto/cast_common.ko
kernel/arch/x86/crypto/ablk_helper.ko kernel/cry
--More-- (0%)
```

Il est possible d'obtenir des informations sur un module grâce à la commande **modinfo** :

```
[root@centos7 ~]# modinfo bonding
filename:      /lib/modules/3.10.0-327.13.1.el7.x86_64/kernel/drivers/net/bonding/bonding.ko
author:       Thomas Davis, tadavis@lbl.gov and many others
description:  Ethernet Channel Bonding Driver, v3.7.1
version:      3.7.1
license:      GPL
alias:        rtnl-link-bond
rhelversion:  7.2
srcversion:   49765A3F5CDFF2C3DCFD8E6
depends:
intree:       Y
vermagic:     3.10.0-327.13.1.el7.x86_64 SMP mod_unload modversions
signer:       CentOS Linux kernel signing key
sig_key:      6F:33:78:18:7D:83:CD:18:A4:3B:2E:0A:C4:9A:ED:8A:EF:FC:3A:C7
sig_hashalgo: sha256
parm:         max_bonds:Max number of bonded devices (int)
parm:         tx_queues:Max number of transmit queues (default = 16) (int)
parm:         num_grat_arp:Number of peer notifications to send on failover event (alias of num_unsol_na) (int)
parm:         num_unsol_na:Number of peer notifications to send on failover event (alias of num_grat_arp) (int)
parm:         miimon:Link check interval in milliseconds (int)
parm:         updelay:Delay before considering link up, in milliseconds (int)
parm:         downdelay:Delay before considering link down, in milliseconds (int)
parm:         use_carrier:Use netif_carrier_ok (vs MII ioctls) in miimon; 0 for off, 1 for on (default) (int)
parm:         mode:Mode of operation; 0 for balance-rr, 1 for active-backup, 2 for balance-xor, 3 for
```



```
broadcast, 4 for 802.3ad, 5 for balance-tlb, 6 for balance-alb (charp)
parm:          primary:Primary network device to use (charp)
parm:          primary_reselect:Reselect primary slave once it comes up; 0 for always (default), 1 for only if
speed of primary is better, 2 for only on active slave failure (charp)
parm:          lacp_rate:LACPDU tx rate to request from 802.3ad partner; 0 for slow, 1 for fast (charp)
parm:          ad_select:803.ad aggregation selection logic; 0 for stable (default), 1 for bandwidth, 2 for
count (charp)
parm:          min_links:Minimum number of available links before turning on carrier (int)
parm:          xmit_hash_policy:balance-xor and 802.3ad hashing method; 0 for layer 2 (default), 1 for layer
3+4, 2 for layer 2+3, 3 for encap layer 2+3, 4 for encap layer 3+4 (charp)
parm:          arp_interval:arp interval in milliseconds (int)
parm:          arp_ip_target:arp targets in n.n.n.n form (array of charp)
parm:          arp_validate:validate src/dst of ARP probes; 0 for none (default), 1 for active, 2 for backup, 3
for all (charp)
parm:          arp_all_targets:fail on any/all arp targets timeout; 0 for any (default), 1 for all (charp)
parm:          fail_over_mac:For active-backup, do not set all slaves to the same MAC; 0 for none (default), 1
for active, 2 for follow (charp)
parm:          all_slaves_active:Keep all frames received on an interface by setting active flag for all slaves;
0 for never (default), 1 for always. (int)
parm:          resend_igmp:Number of IGMP membership reports to send on link failure (int)
parm:          packets_per_slave:Packets to send per slave in balance-rr mode; 0 for a random slave, 1 packet
per slave (default), >1 packets per slave. (int)
parm:          lp_interval:The number of seconds between instances where the bonding driver sends learning
packets to each slaves peer switch. The default is 1. (uint)
```

Dernièrement, les fichiers dans le repertoire **/etc/modprobe.d** sont utilisés pour spécifier les options éventuelles à passer aux modules lors de leur chargement ainsi que les alias utilisés pour leur faire référence :

```
[root@centos7 ~]# ls /etc/modprobe.d
mlx4.conf
```

```
[root@centos7 ~]# cat /etc/modprobe.d/mlx4.conf
# This file is intended for users to select the various module options
# they need for the mlx4 driver.  On upgrade of the rdma package,
```

```
# any user made changes to this file are preserved. Any changes made
# to the libmlx4.conf file in this directory are overwritten on
# package upgrade.
#
# Some sample options and what they would do
# Enable debugging output, device managed flow control, and disable SRIOV
#options mlx4_core debug_level=1 log_num_mgm_entry_size=-1 probe_vf=0 num_vfs=0
#
# Enable debugging output and create SRIOV devices, but don't attach any of
# the child devices to the host, only the parent device
#options mlx4_core debug_level=1 probe_vf=0 num_vfs=7
#
# Enable debugging output, SRIOV, and attach one of the SRIOV child devices
# in addition to the parent device to the host
#options mlx4_core debug_level=1 probe_vf=1 num_vfs=7
#
# Enable per priority flow control for send and receive, setting both priority
# 1 and 2 as no drop priorities
#options mlx4_en pfctx=3 pfcrx=3
```

## Compilation et installation du noyau et des modules

Commencez par installer les paquets nécessaires :

```
[root@centos7 ~]# yum install qt3-devel libXi-devel gcc-c++ rpmdevtools ncurses-devel
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
 * base: centos.mirrors.ovh.net
 * extras: centos.mirror.fr.planethoster.net
 * updates: mirror1.evolution-host.com
Resolving Dependencies
--> Running transaction check
```

```
---> Package gcc-c++.x86_64 0:4.8.5-4.el7 will be installed
--> Processing Dependency: libstdc++-devel = 4.8.5-4.el7 for package: gcc-c++-4.8.5-4.el7.x86_64
---> Package libXi-devel.x86_64 0:1.7.4-2.el7 will be installed
--> Processing Dependency: xorg-x11-proto-devel for package: libXi-devel-1.7.4-2.el7.x86_64
--> Processing Dependency: pkgconfig(xfixes) for package: libXi-devel-1.7.4-2.el7.x86_64
--> Processing Dependency: pkgconfig(xext) for package: libXi-devel-1.7.4-2.el7.x86_64
--> Processing Dependency: pkgconfig(x11) for package: libXi-devel-1.7.4-2.el7.x86_64
--> Processing Dependency: pkgconfig(inputproto) for package: libXi-devel-1.7.4-2.el7.x86_64
---> Package ncurses-devel.x86_64 0:5.9-13.20130511.el7 will be installed
---> Package qt3-devel.x86_64 0:3.3.8b-51.el7 will be installed
--> Processing Dependency: qt3 = 3.3.8b-51.el7 for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: mesa-libGLU-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: mesa-libGL-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libpng-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libmng-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libjpeg-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libXt-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libXrender-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libXrandr-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libXinerama-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libXft-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libXcursor-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libSM-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libICE-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: freetype-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: fontconfig-devel for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libqui.so.1()(64bit) for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libqt-mt.so.3()(64bit) for package: qt3-devel-3.3.8b-51.el7.x86_64
--> Processing Dependency: libmng.so.1()(64bit) for package: qt3-devel-3.3.8b-51.el7.x86_64
---> Package rpmdevtools.noarch 0:8.3-5.el7 will be installed
--> Processing Dependency: rpm-build >= 4.4.2.3 for package: rpmdevtools-8.3-5.el7.noarch
--> Running transaction check
---> Package fontconfig-devel.x86_64 0:2.10.95-7.el7 will be installed
--> Processing Dependency: pkgconfig(expat) for package: fontconfig-devel-2.10.95-7.el7.x86_64
```

```
---> Package freetype-devel.x86_64 0:2.4.11-11.el7 will be installed
--> Processing Dependency: zlib-devel for package: freetype-devel-2.4.11-11.el7.x86_64
---> Package libICE-devel.x86_64 0:1.0.9-2.el7 will be installed
---> Package libSM-devel.x86_64 0:1.2.2-2.el7 will be installed
---> Package libX11-devel.x86_64 0:1.6.3-2.el7 will be installed
--> Processing Dependency: pkgconfig(xcb) >= 1.1.92 for package: libX11-devel-1.6.3-2.el7.x86_64
--> Processing Dependency: pkgconfig(xcb) for package: libX11-devel-1.6.3-2.el7.x86_64
---> Package libXcursor-devel.x86_64 0:1.1.14-2.1.el7 will be installed
---> Package libXext-devel.x86_64 0:1.3.3-3.el7 will be installed
---> Package libXfixes-devel.x86_64 0:5.0.1-2.1.el7 will be installed
---> Package libXft-devel.x86_64 0:2.3.2-2.el7 will be installed
---> Package libXinerama-devel.x86_64 0:1.1.3-2.1.el7 will be installed
---> Package libXrandr-devel.x86_64 0:1.4.2-2.el7 will be installed
---> Package libXrender-devel.x86_64 0:0.9.8-2.1.el7 will be installed
---> Package libXt-devel.x86_64 0:1.1.4-6.1.el7 will be installed
---> Package libjpeg-turbo-devel.x86_64 0:1.2.90-5.el7 will be installed
---> Package libmng.x86_64 0:1.0.10-14.el7 will be installed
---> Package libmng-devel.x86_64 0:1.0.10-14.el7 will be installed
---> Package libpng-devel.x86_64 2:1.5.13-7.el7_2 will be installed
---> Package libstdc++-devel.x86_64 0:4.8.5-4.el7 will be installed
---> Package mesa-libGL-devel.x86_64 0:10.6.5-3.20150824.el7 will be installed
--> Processing Dependency: pkgconfig(xshmfence) >= 1.1 for package: mesa-libGL-devel-10.6.5-3.20150824.el7.x86_64
--> Processing Dependency: pkgconfig(libdrm) >= 2.4.38 for package: mesa-libGL-devel-10.6.5-3.20150824.el7.x86_64
--> Processing Dependency: pkgconfig(xxf86vm) for package: mesa-libGL-devel-10.6.5-3.20150824.el7.x86_64
--> Processing Dependency: pkgconfig(xdamage) for package: mesa-libGL-devel-10.6.5-3.20150824.el7.x86_64
--> Processing Dependency: gl-manpages for package: mesa-libGL-devel-10.6.5-3.20150824.el7.x86_64
---> Package mesa-libGLU-devel.x86_64 0:9.0.0-4.el7 will be installed
---> Package qt3.x86_64 0:3.3.8b-51.el7 will be installed
---> Package rpm-build.x86_64 0:4.11.3-17.el7 will be installed
--> Processing Dependency: system-rpm-config for package: rpm-build-4.11.3-17.el7.x86_64
--> Processing Dependency: perl(Thread::Queue) for package: rpm-build-4.11.3-17.el7.x86_64
---> Package xorg-x11-proto-devel.noarch 0:7.7-12.el7 will be installed
--> Running transaction check
---> Package expat-devel.x86_64 0:2.1.0-8.el7 will be installed
```

```

---> Package gl-manpages.noarch 0:1.1-7.20130122.el7 will be installed
---> Package libXdamage-devel.x86_64 0:1.1.4-4.1.el7 will be installed
---> Package libXxf86vm-devel.x86_64 0:1.1.3-2.1.el7 will be installed
---> Package libdrm-devel.x86_64 0:2.4.60-3.el7 will be installed
---> Package libxcb-devel.x86_64 0:1.11-4.el7 will be installed
--> Processing Dependency: pkgconfig(xau) >= 0.99.2 for package: libxcb-devel-1.11-4.el7.x86_64
---> Package libxshmfence-devel.x86_64 0:1.2-1.el7 will be installed
---> Package perl-Thread-Queue.noarch 0:3.02-2.el7 will be installed
---> Package redhat-rpm-config.noarch 0:9.1.0-68.el7.centos will be installed
--> Processing Dependency: dwz >= 0.4 for package: redhat-rpm-config-9.1.0-68.el7.centos.noarch
--> Processing Dependency: perl-srpm-macros for package: redhat-rpm-config-9.1.0-68.el7.centos.noarch
---> Package zlib-devel.x86_64 0:1.2.7-15.el7 will be installed
--> Running transaction check
---> Package dwz.x86_64 0:0.11-3.el7 will be installed
---> Package libXau-devel.x86_64 0:1.0.8-2.1.el7 will be installed
---> Package perl-srpm-macros.noarch 0:1-8.el7 will be installed
--> Finished Dependency Resolution

```

Dependencies Resolved

| =====         |       |        |                     |
|---------------|-------|--------|---------------------|
| =====         |       |        |                     |
| Package       |       | Arch   | Version             |
| Repository    | Size  |        |                     |
| =====         |       |        |                     |
| Installing:   |       |        |                     |
| gcc-c++       |       | x86_64 | 4.8.5-4.el7         |
| base          | 7.2 M |        |                     |
| libXi-devel   |       | x86_64 | 1.7.4-2.el7         |
| base          | 105 k |        |                     |
| ncurses-devel |       | x86_64 | 5.9-13.20130511.el7 |
| base          | 713 k |        |                     |
| qt3-devel     |       | x86_64 | 3.3.8b-51.el7       |

|                              |       |        |                    |
|------------------------------|-------|--------|--------------------|
| base                         | 8.8 M |        |                    |
| rpmdevtools                  |       | noarch | 8.3-5.el7          |
| base                         | 97 k  |        |                    |
| Installing for dependencies: |       |        |                    |
| dwz                          |       | x86_64 | 0.11-3.el7         |
| base                         | 99 k  |        |                    |
| expat-devel                  |       | x86_64 | 2.1.0-8.el7        |
| base                         | 56 k  |        |                    |
| fontconfig-devel             |       | x86_64 | 2.10.95-7.el7      |
| base                         | 128 k |        |                    |
| freetype-devel               |       | x86_64 | 2.4.11-11.el7      |
| base                         | 356 k |        |                    |
| gl-manpages                  |       | noarch | 1.1-7.20130122.el7 |
| base                         | 994 k |        |                    |
| libICE-devel                 |       | x86_64 | 1.0.9-2.el7        |
| base                         | 49 k  |        |                    |
| libSM-devel                  |       | x86_64 | 1.2.2-2.el7        |
| base                         | 13 k  |        |                    |
| libX11-devel                 |       | x86_64 | 1.6.3-2.el7        |
| base                         | 980 k |        |                    |
| libXau-devel                 |       | x86_64 | 1.0.8-2.1.el7      |
| base                         | 14 k  |        |                    |
| libXcursor-devel             |       | x86_64 | 1.1.14-2.1.el7     |
| base                         | 23 k  |        |                    |
| libXdamage-devel             |       | x86_64 | 1.1.4-4.1.el7      |
| base                         | 9.7 k |        |                    |
| libXext-devel                |       | x86_64 | 1.3.3-3.el7        |
| base                         | 75 k  |        |                    |
| libXfixes-devel              |       | x86_64 | 5.0.1-2.1.el7      |
| base                         | 13 k  |        |                    |
| libXft-devel                 |       | x86_64 | 2.3.2-2.el7        |
| base                         | 19 k  |        |                    |
| libXinerama-devel            |       | x86_64 | 1.1.3-2.1.el7      |
| base                         | 13 k  |        |                    |

|                     |       |        |                       |
|---------------------|-------|--------|-----------------------|
| libXrandr-devel     |       | x86_64 | 1.4.2-2.el7           |
| base                | 21 k  |        |                       |
| libXrender-devel    |       | x86_64 | 0.9.8-2.1.el7         |
| base                | 16 k  |        |                       |
| libXt-devel         |       | x86_64 | 1.1.4-6.1.el7         |
| base                | 445 k |        |                       |
| libXxf86vm-devel    |       | x86_64 | 1.1.3-2.1.el7         |
| base                | 18 k  |        |                       |
| libdrm-devel        |       | x86_64 | 2.4.60-3.el7          |
| base                | 92 k  |        |                       |
| libjpeg-turbo-devel |       | x86_64 | 1.2.90-5.el7          |
| base                | 98 k  |        |                       |
| libmng              |       | x86_64 | 1.0.10-14.el7         |
| base                | 171 k |        |                       |
| libmng-devel        |       | x86_64 | 1.0.10-14.el7         |
| base                | 85 k  |        |                       |
| libpng-devel        |       | x86_64 | 2:1.5.13-7.el7_2      |
| updates             | 122 k |        |                       |
| libstdc++-devel     |       | x86_64 | 4.8.5-4.el7           |
| base                | 1.5 M |        |                       |
| libxcb-devel        |       | x86_64 | 1.11-4.el7            |
| base                | 1.1 M |        |                       |
| libxshmfence-devel  |       | x86_64 | 1.2-1.el7             |
| base                | 5.4 k |        |                       |
| mesa-libGL-devel    |       | x86_64 | 10.6.5-3.20150824.el7 |
| base                | 147 k |        |                       |
| mesa-libGLU-devel   |       | x86_64 | 9.0.0-4.el7           |
| base                | 9.0 k |        |                       |
| perl-Thread-Queue   |       | noarch | 3.02-2.el7            |
| base                | 17 k  |        |                       |
| perl-srpm-macros    |       | noarch | 1-8.el7               |
| base                | 4.6 k |        |                       |
| qt3                 |       | x86_64 | 3.3.8b-51.el7         |
| base                | 3.5 M |        |                       |

|                      |       |        |                     |
|----------------------|-------|--------|---------------------|
| redhat-rpm-config    |       | noarch | 9.1.0-68.el7.centos |
| base                 | 77 k  |        |                     |
| rpm-build            |       | x86_64 | 4.11.3-17.el7       |
| base                 | 143 k |        |                     |
| xorg-x11-proto-devel |       | noarch | 7.7-12.el7          |
| base                 | 281 k |        |                     |
| zlib-devel           |       | x86_64 | 1.2.7-15.el7        |
| base                 | 50 k  |        |                     |

#### Transaction Summary

=====

Install 5 Packages (+36 Dependent packages)

Total download size: 27 M

Installed size: 90 M

Is this ok [y/d/N]: y



Il n'est pas conseillé de compiler en tant que root pour des raisons de sécurité. Pour pouvoir utiliser le compte d'un utilisateur pour créer un nouveau noyau, celui-ci doit disposer de plusieurs Go d'espace libre.

## Déplacer /home



Arrêtez votre machine virtuelle. Ajoutez un deuxième disque de 20 Go au contrôleur SATA en utilisant la section **Stockage** des paramètres de la machine virtuelle. Le format du disque doit être **vmdk**. Nommez ce disque **RedHatHome** et re-démarrez la machine virtuelle en vous connectant directement en tant que **root**.

Créez une seule partition sur **/dev/sdb** :



```
[root@centos7 ~]# fdisk /dev/sdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0x88708329.

Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
Select (default p): p
Partition number (1-4, default 1):
First sector (2048-41943039, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-41943039, default 41943039):
Using default value 41943039
Partition 1 of type Linux and of size 20 GiB is set

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
```

Créez maintenant un système de fichiers ext4 sur **/dev/sdb1** :

```
[root@centos7 ~]# mkfs.ext4 /dev/sdb1
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
```

```
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
1310720 inodes, 5242624 blocks
262131 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=2153775104
160 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
    4096000

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

Montez **/dev/sdb1** sur /mnt :

```
[root@centos7 ~]# mount /dev/sdb1 /mnt
```

Copiez le contenu de /home vers /mnt :

```
[root@centos7 ~]# cp -a /home/* /mnt
```

Démontez /dev/sdb1 et déplacez /home vers /root :

```
[root@centos7 ~]# umount /mnt
[root@centos7 ~]# mv /home /root
```

Identifiez l'UUID de /dev/sdb1 :

```
[root@centos7 ~]# ls -l /dev/disk/by-uuid/ | grep sdb1
```

```
lrwxrwxrwx. 1 root root 10 9 août 06:47 a5e2457f-7337-41f4-b958-e403eb419f94 -> ../../sdb1
```

Editez le fichier **/etc/fstab** :

[/etc/fstab](#)

```
#
# /etc/fstab
# Created by anaconda on Sat Apr 30 11:27:02 2016
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=e65fe7da-cda8-4f5a-a827-1b5cabe94bed /          xfs      defaults      0 0
UUID=2d947276-66e8-41f4-8475-b64b67d7a249 /boot      xfs      defaults      0 0
UUID=3181601a-7295-4ef0-a92c-f21f76b18e64 swap       swap     defaults      0 0
UUID=a5e2457f-7337-41f4-b958-e403eb419f94 /home      ext4     defaults      1 2
```

Créez le point de montage /home :

```
[root@centos7 ~]# mkdir /home
```

Montez /dev/sdb1 :

```
[root@centos7 ~]# mount -a
[root@centos7 ~]# mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime,seclabel)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
devtmpfs on /dev type devtmpfs (rw,nosuid,seclabel,size=236036k,nr_inodes=59009,mode=755)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,seclabel)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,seclabel,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,seclabel,mode=755)
```

```

tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,seclabel,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup
(rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/usr/lib/systemd/systemd-cgroups-agent,name=systemd)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpuacct,cpu)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb)
cgroup on /sys/fs/cgroup/net_cls type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
configfs on /sys/kernel/config type configfs (rw,relatime)
/dev/sda2 on / type xfs (rw,relatime,seclabel,attr2,inode64,noquota)
selinuxfs on /sys/fs/selinux type selinuxfs (rw,relatime)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs
(rw,relatime,fd=30,prgrp=1,timeout=300,minproto=5,maxproto=5,direct)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,seclabel)
mqueue on /dev/mqueue type mqueue (rw,relatime,seclabel)
tmpfs on /tmp type tmpfs (rw,seclabel)
sunrpc on /var/lib/nfs/rpc_pipefs type rpc_pipefs (rw,relatime)
nfsd on /proc/fs/nfsd type nfsd (rw,relatime)
/dev/sda1 on /boot type xfs (rw,relatime,seclabel,attr2,inode64,noquota)
/dev/sdb1 on /home type ext4 (rw,relatime,seclabel,data=ordered)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,seclabel,size=50080k,mode=700,uid=1000,gid=1000)

```

Notez la taille de /home :

```

[trainee@centos7 ~]$ df -h
Sys. de fichiers Taille Utilisé Dispo Uti% Monté sur
/dev/sda2          9,8G    4,4G  5,5G  45% /
devtmpfs           231M      0   231M   0% /dev

```

|           |      |      |      |      |                |
|-----------|------|------|------|------|----------------|
| tmpfs     | 245M | 0    | 245M | 0%   | /dev/shm       |
| tmpfs     | 245M | 4,7M | 240M | 2%   | /run           |
| tmpfs     | 245M | 0    | 245M | 0%   | /sys/fs/cgroup |
| tmpfs     | 245M | 72K  | 245M | 1%   | /tmp           |
| /dev/sda1 | 197M | 197M | 20K  | 100% | /boot          |
| /dev/sdb1 | 20G  | 65M  | 19G  | 1%   | /home          |
| tmpfs     | 49M  | 0    | 49M  | 0%   | /run/user/1000 |



Fermez la session de root et connectez-vous en tant que trainee.

## Créer un Nouveau Noyau

Pour créer l'arborescence de l'environnement de création de paquets dans /home/trainee, utilisez la commande **rpmdev-setuptree** :

```
[trainee@centos7 ~]$ rpmdev-setuptree
[trainee@centos7 ~]$ ls -laR rpmbuild/
rpmbuild/:
total 28
drwxrwxr-x.  7 trainee trainee 4096  9 août  06:56 .
drwx----- 15 trainee trainee 4096  9 août  06:56 ..
drwxrwxr-x.  2 trainee trainee 4096  9 août  06:56 BUILD
drwxrwxr-x.  2 trainee trainee 4096  9 août  06:56 RPMS
drwxrwxr-x.  2 trainee trainee 4096  9 août  06:56 SOURCES
drwxrwxr-x.  2 trainee trainee 4096  9 août  06:56 SPECS
drwxrwxr-x.  2 trainee trainee 4096  9 août  06:56 SRPMS

rpmbuild/BUILD:
total 8
drwxrwxr-x. 2 trainee trainee 4096  9 août  06:56 .
drwxrwxr-x. 7 trainee trainee 4096  9 août  06:56 ..
```

```
rpmbuild/RPMS:
total 8
drwxrwxr-x. 2 trainee trainee 4096  9 août  06:56 .
drwxrwxr-x. 7 trainee trainee 4096  9 août  06:56 ..

rpmbuild/SOURCES:
total 8
drwxrwxr-x. 2 trainee trainee 4096  9 août  06:56 .
drwxrwxr-x. 7 trainee trainee 4096  9 août  06:56 ..

rpmbuild/SPECS:
total 8
drwxrwxr-x. 2 trainee trainee 4096  9 août  06:56 .
drwxrwxr-x. 7 trainee trainee 4096  9 août  06:56 ..

rpmbuild/SRPMS:
total 8
drwxrwxr-x. 2 trainee trainee 4096  9 août  06:56 .
drwxrwxr-x. 7 trainee trainee 4096  9 août  06:56 ..
```

Téléchargez le rpm source du noyau :

```
[trainee@centos7 ~]$ uname -a
Linux centos7.fenestros.loc 3.10.0-327.13.1.el7.x86_64 #1 SMP Thu Mar 31 16:04:38 UTC 2016 x86_64 x86_64 x86_64
GNU/Linux

[trainee@centos7 ~]$ wget
http://vault.centos.org/7.2.1511/updates/Source/SPackages/kernel-3.10.0-327.13.1.el7.src.rpm
--2016-08-09 06:57:08--
http://vault.centos.org/7.2.1511/updates/Source/SPackages/kernel-3.10.0-327.13.1.el7.src.rpm
Résolution de vault.centos.org (vault.centos.org)... 88.208.217.170, 2a00:f10:10b:13::10
Connexion vers vault.centos.org (vault.centos.org)|88.208.217.170|:80...connecté.
requête HTTP transmise, en attente de la réponse...200 OK
Longueur: 83047820 (79M) [application/x-rpm]
```

Sauvegarde en : «kernel-3.10.0-327.13.1.el7.src.rpm»

```
100%[=====
=====>] 83 047 820   496KB/s   ds 2m 52s
```

2016-08-09 07:00:00 (471 KB/s) - «kernel-3.10.0-327.13.1.el7.src.rpm» sauvegardé [83047820/83047820]

Installez maintenant les dépendances pour le rpm source en tant que root :

```
[trainee@centos7 ~]$ su -
Mot de passe : fenestros
[root@centos7 ~]# yum-builddep /home/trainee/kernel-3.10.0-327.13.1.el7.src.rpm
Loaded plugins: fastestmirror, langpacks
Enabling base-source repository
Enabling extras-source repository
Enabling updates-source repository
base-source
| 2.9 kB  00:00:00
extras-source
| 2.9 kB  00:00:00
updates-source
| 2.9 kB  00:00:00
(1/3): extras-source/7/primary_db
| 43 kB  00:00:00
(2/3): base-source/7/primary_db
| 949 kB  00:00:00
(3/3): updates-source/7/primary_db
| 140 kB  00:00:00
Loading mirror speeds from cached hostfile
* base: centos.mirrors.ovh.net
* extras: centos.mirror.fr.planethoster.net
* updates: mirror1.evolution-host.com
Checking for new repos for mirrors
Getting requirements for kernel-3.10.0-327.13.1.el7.src
```

```
--> Already installed : kmod-20-5.el7.x86_64
--> Already installed : patch-2.7.1-8.el7.x86_64
--> Already installed : bash-4.2.46-19.el7.x86_64
--> Already installed : coreutils-8.22-15.el7_2.1.x86_64
--> Already installed : 2:tar-1.26-29.el7.x86_64
--> Already installed : xz-5.1.2-12alpha.el7.x86_64
--> Already installed : 1:findutils-4.5.11-5.el7.x86_64
--> Already installed : gzip-1.5-8.el7.x86_64
--> m4-1.4.16-10.el7.x86_64
--> Already installed : 4:perl-5.16.3-286.el7.x86_64
--> Already installed : 1:make-3.82-21.el7.x86_64
--> Already installed : diffutils-3.3-4.el7.x86_64
--> Already installed : gawk-4.0.2-4.el7.x86_64
--> Already installed : gcc-4.8.5-4.el7.x86_64
--> Already installed : binutils-2.23.52.0.1-55.el7.x86_64
--> Already installed : redhat-rpm-config-9.1.0-68.el7.centos.noarch
--> Already installed : hostname-3.13-3.el7.x86_64
--> Already installed : net-tools-2.0-0.17.20131004git.el7.x86_64
--> Already installed : bc-1.06.95-13.el7.x86_64
--> xmlto-0.0.25-7.el7.x86_64
--> asciidoc-8.6.8-5.el7.noarch
--> Already installed : 1:openssl-1.0.1e-51.el7_2.4.x86_64
--> hmacalc-0.9.13-4.el7.x86_64
--> python-devel-2.7.5-34.el7.x86_64
--> newt-devel-0.52.15-4.el7.x86_64
--> perl-ExtUtils-Embed-1.30-286.el7.noarch
--> Already installed : rpm-build-4.11.3-17.el7.x86_64
--> Already installed : elfutils-0.163-3.el7.x86_64
--> Running transaction check
--> Package asciidoc.noarch 0:8.6.8-5.el7 will be installed
--> Processing Dependency: source-highlight for package: asciidoc-8.6.8-5.el7.noarch
--> Processing Dependency: graphviz for package: asciidoc-8.6.8-5.el7.noarch
--> Processing Dependency: docbook-style-xsl for package: asciidoc-8.6.8-5.el7.noarch
--> Package hmacalc.x86_64 0:0.9.13-4.el7 will be installed
```



```
---> Package m4.x86_64 0:1.4.16-10.el7 will be installed
---> Package newt-devel.x86_64 0:0.52.15-4.el7 will be installed
--> Processing Dependency: slang-devel for package: newt-devel-0.52.15-4.el7.x86_64
---> Package perl-ExtUtils-Embed.noarch 0:1.30-286.el7 will be installed
--> Processing Dependency: perl-devel for package: perl-ExtUtils-Embed-1.30-286.el7.noarch
---> Package python-devel.x86_64 0:2.7.5-34.el7 will be installed
---> Package xmlto.x86_64 0:0.0.25-7.el7 will be installed
--> Processing Dependency: text-www-browser for package: xmlto-0.0.25-7.el7.x86_64
--> Processing Dependency: flex for package: xmlto-0.0.25-7.el7.x86_64
--> Processing Dependency: docbook-dtds for package: xmlto-0.0.25-7.el7.x86_64
--> Running transaction check
---> Package docbook-dtds.noarch 0:1.0-60.el7 will be installed
--> Processing Dependency: sgml-common for package: docbook-dtds-1.0-60.el7.noarch
---> Package docbook-style-xsl.noarch 0:1.78.1-3.el7 will be installed
---> Package flex.x86_64 0:2.5.37-3.el7 will be installed
---> Package graphviz.x86_64 0:2.30.1-19.el7 will be installed
--> Processing Dependency: libXaw.so.7()(64bit) for package: graphviz-2.30.1-19.el7.x86_64
---> Package lynx.x86_64 0:2.8.8-0.3.dev15.el7 will be installed
---> Package perl-devel.x86_64 4:5.16.3-286.el7 will be installed
--> Processing Dependency: systemtap-sdt-devel for package: 4:perl-devel-5.16.3-286.el7.x86_64
--> Processing Dependency: perl(ExtUtils::ParseXS) for package: 4:perl-devel-5.16.3-286.el7.x86_64
--> Processing Dependency: perl(ExtUtils::MakeMaker) for package: 4:perl-devel-5.16.3-286.el7.x86_64
--> Processing Dependency: perl(ExtUtils::Installed) for package: 4:perl-devel-5.16.3-286.el7.x86_64
--> Processing Dependency: libdb-devel for package: 4:perl-devel-5.16.3-286.el7.x86_64
--> Processing Dependency: gdbm-devel for package: 4:perl-devel-5.16.3-286.el7.x86_64
---> Package slang-devel.x86_64 0:2.2.4-11.el7 will be installed
---> Package source-highlight.x86_64 0:3.1.6-6.el7 will be installed
--> Processing Dependency: ctags for package: source-highlight-3.1.6-6.el7.x86_64
--> Processing Dependency: libboost_regex.so.1.53.0()(64bit) for package: source-highlight-3.1.6-6.el7.x86_64
--> Running transaction check
---> Package boost-regex.x86_64 0:1.53.0-25.el7 will be installed
---> Package ctags.x86_64 0:5.8-13.el7 will be installed
---> Package gdbm-devel.x86_64 0:1.10-8.el7 will be installed
---> Package libXaw.x86_64 0:1.0.12-5.el7 will be installed
```

```
---> Package libdb-devel.x86_64 0:5.3.21-19.el7 will be installed
---> Package perl-ExtUtils-Install.noarch 0:1.58-286.el7 will be installed
---> Package perl-ExtUtils-MakeMaker.noarch 0:6.68-3.el7 will be installed
--> Processing Dependency: perl(Test::Harness) for package: perl-ExtUtils-MakeMaker-6.68-3.el7.noarch
--> Processing Dependency: perl(ExtUtils::Manifest) for package: perl-ExtUtils-MakeMaker-6.68-3.el7.noarch
---> Package perl-ExtUtils-ParseXS.noarch 1:3.18-2.el7 will be installed
---> Package sgml-common.noarch 0:0.6.3-39.el7 will be installed
---> Package systemtap-sdt-devel.x86_64 0:2.8-10.el7 will be installed
--> Running transaction check
---> Package perl-ExtUtils-Manifest.noarch 0:1.61-244.el7 will be installed
---> Package perl-Test-Harness.noarch 0:3.28-3.el7 will be installed
--> Finished Dependency Resolution
```

#### Dependencies Resolved

| =====               |       |        |               |
|---------------------|-------|--------|---------------|
| Package             |       | Arch   | Version       |
| Repository          | Size  |        |               |
| =====               |       |        |               |
| Installing:         |       |        |               |
| asciidoc            |       | noarch | 8.6.8-5.el7   |
| base                | 251 k |        |               |
| hmaccalc            |       | x86_64 | 0.9.13-4.el7  |
| base                | 26 k  |        |               |
| m4                  |       | x86_64 | 1.4.16-10.el7 |
| base                | 256 k |        |               |
| newt-devel          |       | x86_64 | 0.52.15-4.el7 |
| base                | 51 k  |        |               |
| perl-ExtUtils-Embed |       | noarch | 1.30-286.el7  |
| base                | 49 k  |        |               |
| python-devel        |       | x86_64 | 2.7.5-34.el7  |
| base                | 391 k |        |               |

|                              |       |        |                     |
|------------------------------|-------|--------|---------------------|
| xmlto                        |       | x86_64 | 0.0.25-7.el7        |
| base                         | 50 k  |        |                     |
| Installing for dependencies: |       |        |                     |
| boost-regex                  |       | x86_64 | 1.53.0-25.el7       |
| base                         | 294 k |        |                     |
| ctags                        |       | x86_64 | 5.8-13.el7          |
| base                         | 155 k |        |                     |
| docbook-dtds                 |       | noarch | 1.0-60.el7          |
| base                         | 226 k |        |                     |
| docbook-style-xsl            |       | noarch | 1.78.1-3.el7        |
| base                         | 2.0 M |        |                     |
| flex                         |       | x86_64 | 2.5.37-3.el7        |
| base                         | 292 k |        |                     |
| gdbm-devel                   |       | x86_64 | 1.10-8.el7          |
| base                         | 47 k  |        |                     |
| graphviz                     |       | x86_64 | 2.30.1-19.el7       |
| base                         | 1.3 M |        |                     |
| libXaw                       |       | x86_64 | 1.0.12-5.el7        |
| base                         | 190 k |        |                     |
| libdb-devel                  |       | x86_64 | 5.3.21-19.el7       |
| base                         | 38 k  |        |                     |
| lynx                         |       | x86_64 | 2.8.8-0.3.dev15.el7 |
| base                         | 1.4 M |        |                     |
| perl-ExtUtils-Install        |       | noarch | 1.58-286.el7        |
| base                         | 73 k  |        |                     |
| perl-ExtUtils-MakeMaker      |       | noarch | 6.68-3.el7          |
| base                         | 275 k |        |                     |
| perl-ExtUtils-Manifest       |       | noarch | 1.61-244.el7        |
| base                         | 31 k  |        |                     |
| perl-ExtUtils-ParseXS        |       | noarch | 1:3.18-2.el7        |
| base                         | 77 k  |        |                     |
| perl-Test-Harness            |       | noarch | 3.28-3.el7          |
| base                         | 302 k |        |                     |
| perl-devel                   |       | x86_64 | 4:5.16.3-286.el7    |

|                     |       |        |              |
|---------------------|-------|--------|--------------|
| base                | 452 k |        |              |
| sgml-common         |       | noarch | 0.6.3-39.el7 |
| base                | 55 k  |        |              |
| slang-devel         |       | x86_64 | 2.2.4-11.el7 |
| base                | 91 k  |        |              |
| source-highlight    |       | x86_64 | 3.1.6-6.el7  |
| base                | 611 k |        |              |
| systemtap-sdt-devel |       | x86_64 | 2.8-10.el7   |
| base                | 65 k  |        |              |

#### Transaction Summary

=====

Install 7 Packages (+20 Dependent packages)

Total download size: 9.0 M

Installed size: 43 M

Is this ok [y/d/N]: y

Installez maintenant le paquet **kernel-3.10.0-327.13.1.el7.src.rpm** :

```
[root@centos7 ~]# exit
logout
[traine@centos7 ~]$ rpm -Uvh kernel-3.10.0-327.13.1.el7.src.rpm
Mise à jour / installation...
 1:kernel-3.10.0-327.13.1.el7      ##### [100%]
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
```

[illegible]

```
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
attention : utilisateur builder inexistant - utilisation de root
attention : groupe builder inexistant - utilisation de root
```



Les erreurs sont sans importance.

## Préparer l'Arborescence Source du Noyau

Naviguez vers le répertoire **~/rpmbuild/SPECS** et utilisez la commande **rpmbuild** pour préparer l'arborescence source du noyau :

```
[trainee@centos7 ~]$ cd ~/rpmbuild/SPECS
[trainee@centos7 SPECS]$ rpmbuild -bp --target=$(uname -m) kernel.spec
Construction pour plate-formes cibles: x86_64
```

Construction pour cible x86\_64

erreur : Dépendances de construction manquantes:

```
psign >= 0.109-4 est nécessaire pour kernel-3.10.0-327.13.1.el7.x86_64
elfutils-devel est nécessaire pour kernel-3.10.0-327.13.1.el7.x86_64
binutils-devel est nécessaire pour kernel-3.10.0-327.13.1.el7.x86_64
bison est nécessaire pour kernel-3.10.0-327.13.1.el7.x86_64
audit-libs-devel est nécessaire pour kernel-3.10.0-327.13.1.el7.x86_64
numactl-devel est nécessaire pour kernel-3.10.0-327.13.1.el7.x86_64
pciutils-devel est nécessaire pour kernel-3.10.0-327.13.1.el7.x86_64
```



Notez qu'il existe toujours des dépendances manquantes !

Redevenez root et installez les dépendances :

```
[trainee@centos7 SPECS]$ cd -
/home/trainee
[trainee@centos7 ~]$ su -
Mot de passe :
Dernière connexion : lundi 8 août 2016 à 16:39:54 CEST sur pts/0
[root@centos7 ~]# yum install elfutils-devel binutils-devel bison audit-libs-devel numactl-devel pciutils-devel
psign
...
```

Vous pouvez maintenant utiliser la commande rpmbuild pour préparer l'arborescence source du noyau :

```
[root@centos7 ~]# exit
logout
[trainee@centos7 ~]$ cd ~/rpmbuild/SPECS
[trainee@centos7 SPECS]$ rpmbuild -bp --target=$(uname -m) kernel.spec
Construction pour plate-formes cibles: x86_64
Construction pour cible x86_64
```

```
Exécution_de(%prep) : /bin/sh -e /var/tmp/rpm-tmp.xP60kC
+ umask 022
+ cd /home/trainee/rpmbuild/BUILD
+ patch_command='patch -p1 -F1 -s'
+ cd /home/trainee/rpmbuild/BUILD
+ rm -rf kernel-3.10.0-327.13.1.el7
+ /usr/bin/mkdir -p kernel-3.10.0-327.13.1.el7
+ cd kernel-3.10.0-327.13.1.el7
+ /usr/bin/xz -dc /home/trainee/rpmbuild/SOURCES/linux-3.10.0-327.13.1.el7.tar.xz
+ /usr/bin/tar -xf -
...
```

A l'issu du processus, examinez l'arborescence :

```
[trainee@centos7 SPECS]$ ls -la ~/rpmbuild/BUILD/kernel-3.10.0-327.13.1.el7/linux-3.10.0-327.13.1.el7.x86_64/
total 824
drwxr-xr-x. 24 trainee trainee 4096 8 août 16:52 .
drwxr-xr-x. 3 trainee trainee 4096 8 août 16:52 ..
drwxr-xr-x. 32 trainee trainee 4096 8 août 16:52 arch
drwxr-xr-x. 3 trainee trainee 4096 29 févr. 18:35 block
-rw-r--r--. 1 trainee trainee 126411 8 août 16:52 .config
-rw-r--r--. 1 trainee trainee 126420 8 août 16:52 .config.old
drwxr-xr-x. 2 trainee trainee 4096 8 août 16:52 configs
-rw-r--r--. 1 trainee trainee 18693 29 févr. 18:35 COPYING
-rw-r--r--. 1 trainee trainee 95317 29 févr. 18:35 CREDITS
drwxr-xr-x. 4 trainee trainee 4096 29 févr. 18:35 crypto
drwxr-xr-x. 101 trainee trainee 12288 8 août 16:52 Documentation
drwxr-xr-x. 114 trainee trainee 4096 29 févr. 18:35 drivers
drwxr-xr-x. 36 trainee trainee 4096 8 août 16:52 firmware
drwxr-xr-x. 74 trainee trainee 4096 29 févr. 18:35 fs
-rw-r--r--. 1 trainee trainee 46 29 févr. 18:35 .gitattributes
drwxr-xr-x. 27 trainee trainee 4096 8 août 16:52 include
drwxr-xr-x. 2 trainee trainee 4096 29 févr. 18:35 init
drwxr-xr-x. 2 trainee trainee 4096 29 févr. 18:35 ipc
```



```
-rw-r--r--. 1 trainee trainee 2536 29 févr. 18:35 Kbuild
-rw-r--r--. 1 trainee trainee 505 29 févr. 18:35 Kconfig
drwxr-xr-x. 11 trainee trainee 4096 8 août 16:52 kernel
drwxr-xr-x. 10 trainee trainee 4096 8 août 16:52 lib
-rw-r--r--. 1 trainee trainee 4465 29 févr. 18:35 .mailmap
-rw-r--r--. 1 trainee trainee 260223 29 févr. 18:35 MAINTAINERS
-rw-r--r--. 1 trainee trainee 49887 29 févr. 18:35 Makefile
drwxr-xr-x. 2 trainee trainee 4096 29 févr. 18:35 mm
drwxr-xr-x. 56 trainee trainee 4096 29 févr. 18:35 net
-rw-r--r--. 1 trainee trainee 18736 29 févr. 18:35 README
-rw-r--r--. 1 trainee trainee 7485 29 févr. 18:35 REPORTING-BUGS
drwxr-xr-x. 12 trainee trainee 4096 29 févr. 18:35 samples
-rw-r--r--. 1 trainee trainee 0 8 août 16:52 .scmversion
drwxr-xr-x. 13 trainee trainee 4096 8 août 16:52 scripts
drwxr-xr-x. 9 trainee trainee 4096 29 févr. 18:35 security
drwxr-xr-x. 23 trainee trainee 4096 29 févr. 18:35 sound
drwxr-xr-x. 19 trainee trainee 4096 29 févr. 18:35 tools
drwxr-xr-x. 2 trainee trainee 4096 8 août 16:52 usr
drwxr-xr-x. 3 trainee trainee 4096 29 févr. 18:35 virt
```

A l'intérieur de ce répertoire se trouve le fichier .config utilisé pour compiler le noyau :

```
[trainee@centos7 SPECS]$ more
~/rpmbuild/BUILD/kernel-3.10.0-327.13.1.el7/linux-3.10.0-327.13.1.el7.x86_64/.config
#
# Automatically generated file; DO NOT EDIT.
# Linux/x86_64 3.10.0 Kernel Configuration
#
CONFIG_64BIT=y
CONFIG_X86_64=y
CONFIG_X86=y
CONFIG_INSTRUCTION_DECODER=y
CONFIG_OUTPUT_FORMAT="elf64-x86-64"
CONFIG_ARCH_DEFCONFIG="arch/x86/configs/x86_64_defconfig"
```

```
CONFIG_LOCKDEP_SUPPORT=y
CONFIG_STACKTRACE_SUPPORT=y
CONFIG_HAVE_LATENCYTOP_SUPPORT=y
CONFIG_MMU=y
CONFIG_NEED_DMA_MAP_STATE=y
CONFIG_NEED_SG_DMA_LENGTH=y
CONFIG_GENERIC_ISA_DMA=y
CONFIG_GENERIC_BUG=y
CONFIG_GENERIC_BUG_RELATIVE_POINTERS=y
CONFIG_GENERIC_HWEIGHT=y
CONFIG_ARCH_MAY_HAVE_PC_FDC=y
CONFIG_RWSEM_XCHGADD_ALGORITHM=y
CONFIG_GENERIC_CALIBRATE_DELAY=y
CONFIG_ARCH_HAS_CPU_RELAX=y
CONFIG_ARCH_HAS_CACHE_LINE_SIZE=y
CONFIG_ARCH_HAS_CPU_AUTOPROBE=y
CONFIG_HAVE_SETUP_PER_CPU_AREA=y
CONFIG_NEED_PER_CPU_EMBED_FIRST_CHUNK=y
CONFIG_NEED_PER_CPU_PAGE_FIRST_CHUNK=y
CONFIG_ARCH_HIBERNATION_POSSIBLE=y
CONFIG_ARCH_SUSPEND_POSSIBLE=y
CONFIG_ZONE_DMA32=y
CONFIG_AUDIT_ARCH=y
CONFIG_ARCH_SUPPORTS_OPTIMIZED_INLINING=y
CONFIG_ARCH_SUPPORTS_DEBUG_PAGEALLOC=y
CONFIG_HAVE_INTEL_TXT=y
CONFIG_X86_64_SMP=y
CONFIG_X86_HT=y
CONFIG_ARCH_HWEIGHT_CFLAGS="-fcall-saved-rdi -fcall-saved-rsi -fcall-saved-rdx -fcall-saved-rcx -fcall-saved-r8 -fcall-saved-r9 -fcall-saved-r10 -fcall-saved-r11"
CONFIG_ARCH_SUPPORTS_UPROBES=y
CONFIG_DEFCONFIG_LIST="/lib/modules/$UNAME_RELEASE/.config"
CONFIG_IRQ_WORK=y
CONFIG_BUILDTIME_EXTABLE_SORT=y
```

```
#  
--Plus-- (1%)
```

Ce fichier est généré par une des trois commandes suivantes et ne doit **pas** être édité manuellement :

- make config
- make menuconfig
- make xconfig

Dans ce fichier, vous pouvez constater la présence de lignes correspondantes à des fonctionnalités suivies par une lettre ou une valeur. Dans le cas d'une lettre, la signification est la suivante :

- **y**
  - la fonctionnalité est incluse dans le noyau monolithique ou dans le cas d'une dépendance d'un module, dans le module concerné,
- **m**
  - la fonctionnalité est incluse en tant que module,
- **n**
  - la fonctionnalité n'est pas incluse. Cette option est rarement visible car dans bien les cas, la fonctionnalité est simplement commentée dans le fichier lui-même.

Le fichier **Makefile** contient le nom du noyau et spécifie les informations suivantes :

- VERSION,
- PATCHLEVEL,
- SUBLEVEL,
- EXTRAVERSION.

Les trois premières informations sont gérées par **kernel.org** et Linus Torvalds en personne tandis que l'EXTRAVERSION est gérée par Red Hat :

```
[trainee@centos7 SPECS]$ more  
~/rpmbuild/BUILD/kernel-3.10.0-327.13.1.el7/linux-3.10.0-327.13.1.el7.x86_64/Makefile  
VERSION = 3  
PATCHLEVEL = 10  
SUBLEVEL = 0  
EXTRAVERSION =
```

```
NAME = Unicycling Gorilla
RHEL_MAJOR = 7
RHEL_MINOR = 2
RHEL_RELEASE = 327.13.1
RHEL_DRM_VERSION = 4
RHEL_DRM_PATCHLEVEL = 1
RHEL_DRM_SUBLEVEL = 0

# *DOCUMENTATION*
# To see a list of typical targets execute "make help"
# More info can be located in ./README
# Comments in this file are targeted only to the developer, do not
# expect to learn how to build the kernel reading this file.

# Do not:
# o use make's built-in rules and variables
#   (this increases performance and avoids hard-to-debug behaviour);
# o print "Entering directory ...";
MAKEFLAGS += -rR --no-print-directory

# Avoid funny character set dependencies
unexport LC_ALL
LC_COLLATE=C
LC_NUMERIC=C
export LC_COLLATE LC_NUMERIC

# We are using a recursive build, so we need to do a little thinking
# to get the ordering right.
#
# Most importantly: sub-Makefiles should only ever modify files in
# their own directory. If in some directory we have a dependency on
# a file in another dir (which doesn't happen often, but it's often
# unavoidable when linking the built-in.o targets which finally
# turn into vmlinux), we will call a sub make in that other dir, and
```

```
# after that we are sure that everything which is in that other dir
# is now up to date.
#
# The only cases where we need to modify files which have global
# effects are thus separated out and done before the recursive
# descending is started. They are now explicitly listed as the
# prepare rule.
--Plus--(2%)
```



La version 2.6 du noyau a vu le jour en **2003**. Les **SUBLEVEL** se suivaient régulièrement. Avec la version 2.6 du noyau, la valeur paire du **PATCHLEVEL** indiquait que le noyau était stable. Quand vous recompilez le noyau à partir des sources, vous devez modifier la valeur de l'EXTRAVERSION. Le passage à la version 3.0 fut décidé par Linus Torvalds à l'occasion des 20 ans du noyau Linux.

Utilisez maintenant la commande **make oldconfig** :

```
[trainee@centos7 SPECS]$ cd ~/rpmbuild/BUILD/kernel-3.10.0-327.13.1.el7/linux-3.10.0-327.13.1.el7.x86_64
[trainee@centos7 linux-3.10.0-327.13.1.el7.x86_64]$ make oldconfig
scripts/kconfig/conf --oldconfig Kconfig
#
# configuration written to .config
#
```



Cette commande lit le fichier .config du noyau actuel et le compare avec celui des sources du noyau. S'il existent des nouvelles configurations à effectuer dans les sources du noyau, la commande vous pose des questions.

## Paramétrage du noyau

Après avoir modifié la configuration du noyau selon vos besoins en utilisant soit la commande **menuconfig** soit la commande **xconfig** (pas nécessaire pour cet exemple), insérez la sortie de la commande **uname -i** sur la première ligne du fichier .config :

```
[trainee@centos7 linux-3.10.0-327.13.1.el7.x86_64]$ uname -i
x86_64
[trainee@centos7 linux-3.10.0-327.13.1.el7.x86_64]$ vi .config
[trainee@centos7 linux-3.10.0-327.13.1.el7.x86_64]$ head .config
# x86_64
#
# Automatically generated file; DO NOT EDIT.
# Linux/x86 3.10.0 Kernel Configuration
#
CONFIG_64BIT=y
CONFIG_X86_64=y
CONFIG_X86=y
CONFIG_INSTRUCTION_DECODER=y
CONFIG_OUTPUT_FORMAT="elf64-x86-64"
```

Renommez le fichier .config en le plaçant dans le répertoire **~/rpmbuild/SOURCES/** :

```
[trainee@centos7 linux-3.10.0-327.13.1.el7.x86_64]$ cp .config ~/rpmbuild/SOURCES/config-`uname -m`-generic
[trainee@centos7 linux-3.10.0-327.13.1.el7.x86_64]$ ls ~/rpmbuild/SOURCES
centos.cer                cpupower.service          kernel-3.10.0-ppc64-debug.config    kernel-3.10.0-
x86_64.config             Module.kabi_ppc64         x509.genkey                        kernel-3.10.0-ppc64le.config        kernel-3.10.0-x86_64-
centos-kpatch.x509        debrand-rh-i686-cpu.patch  kernel-3.10.0-ppc64le.config        kernel-3.10.0-x86_64-
debug.config             Module.kabi_ppc64le
centos-ldup.x509          debrand-rh_taint.patch    kernel-3.10.0-ppc64le-debug.config  kernel-abi-
whitelists-327.tar.bz2   Module.kabi_s390x
check-kabi                debrand-single-cpu.patch  kernel-3.10.0-s390x.config
linux-3.10.0-327.13.1.el7.tar.xz  Module.kabi_x86_64
config-x86_64-generic     extra_certificates        kernel-3.10.0-s390x-debug.config    linux-kernel-test.patch
secureboot.cer
cpupower.config           kernel-3.10.0-ppc64.config  kernel-3.10.0-s390x-kdump.config    Makefile.common
sign-modules
```



Pour un noyau 32 bits, remplacez **x86\_64** par **i386** et **config-`uname -m`-generic** par **config-x86-32-generic**.

Editez la directive **buildid** dans le fichier **~/rpmbuild/SPECS/kernel.spec** :

```
[trainee@centos7 linux-3.10.0-327.13.1.el7.x86_64]$ cd ~/rpmbuild/SPECS
[trainee@centos7 SPECS]$ vi kernel.spec
[trainee@centos7 SPECS]$ head kernel.spec
# We have to override the new %%install behavior because, well... the kernel is special.
%global __spec_install_pre %{__build_pre}

Summary: The Linux kernel

%define buildid .i2tch

# For a kernel released for public testing, released_kernel should be 1.
# For internal testing builds during development, it should be 0.
%global released_kernel 1
```

## Compiler le Noyau

La compilation du noyau peut prendre beaucoup de temps. La commande utilisée est la suivante :

```
[trainee@centos7 SPECS]$ rpmbuild -bb --target=`uname -m` kernel.spec
```

A l'issu du processus, les rpm se trouvent dans le répertoire **/home/trainee/rpmbuild/RPMS/x86\_64/** :

```
...
Vérification des fichiers non empaquetés : /usr/lib/rpm/check-files
/home/trainee/rpmbuild/BUILDROOT/kernel-3.10.0-327.13.1.el7.i2tch.x86_64
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
```

```

Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-headers-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-debuginfo-common-x86_64-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/perf-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/perf-debuginfo-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/python-perf-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/python-perf-debuginfo-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-tools-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-tools-libs-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-tools-libs-devel-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-tools-debuginfo-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-devel-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-debuginfo-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-debug-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-debug-devel-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Écrit : /home/trainee/rpmbuild/RPMS/x86_64/kernel-debug-debuginfo-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Exécution_de(%clean) : /bin/sh -e /var/tmp/rpm-tmp.HNhcuC
+ umask 022
+ cd /home/trainee/rpmbuild/BUILD
+ cd kernel-3.10.0-327.13.1.el7
+ rm -rf /home/trainee/rpmbuild/BUILDROOT/kernel-3.10.0-327.13.1.el7.i2tch.x86_64
+ exit 0

```

Notez que la génération du nouveau noyau a consommé plus de 9 Go d'espace disque :

```

[trainee@centos7 SPECS]$ df -h

```

| Sys. de fichiers | Taille | Utilisé | Dispo | Uti% | Monté sur      |
|------------------|--------|---------|-------|------|----------------|
| /dev/sda2        | 9,8G   | 4,3G    | 5,5G  | 44%  | /              |
| devtmpfs         | 231M   | 0       | 231M  | 0%   | /dev           |
| tmpfs            | 245M   | 0       | 245M  | 0%   | /dev/shm       |
| tmpfs            | 245M   | 4,7M    | 240M  | 2%   | /run           |
| tmpfs            | 245M   | 0       | 245M  | 0%   | /sys/fs/cgroup |
| tmpfs            | 245M   | 40K     | 245M  | 1%   | /tmp           |
| /dev/sdb1        | 20G    | 9,5G    | 9,2G  | 51%  | /home          |
| /dev/sda1        | 197M   | 197M    | 20K   | 100% | /boot          |



|       |     |   |     |    |                |
|-------|-----|---|-----|----|----------------|
| tmpfs | 49M | 0 | 49M | 0% | /run/user/1000 |
|-------|-----|---|-----|----|----------------|

## Installer le Nouveau Noyau

Installez maintenant les deux paquets **kernel-devel** et **kernel-headers** :

```
[root@centos7 ~]# rpm -ivh /home/trainee/rpmbuild/RPMS/x86_64/kernel-devel-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Preparing... ##### [100%]
Updating / installing...
 1:kernel-devel-3.10.0-327.13.1.el7.##### [100%]
[root@centos7 ~]# rpm -ivh /home/trainee/rpmbuild/RPMS/x86_64/kernel-headers-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Preparing... ##### [100%]
Updating / installing...
 1:kernel-headers-3.10.0-327.13.1.el7.##### [100%]
```

Installez en dernier le nouveau noyau avec la commande **rpm** :

```
[root@centos7 ~]# rpm -ivh --force --nodeps
/home/trainee/rpmbuild/RPMS/x86_64/kernel-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Preparing... ##### [100%]
installing package kernel-3.10.0-327.13.1.el7.i2tch.x86_64 needs 30MB on the /boot filesystem
```



**Important** : Notez le message d'erreur concernant le manque d'espace disponible sur /boot.

Lister maintenant les noyaux installés :

```
[root@centos7 ~]# rpm -qa | grep kernel-3
kernel-3.10.0-327.el7.x86_64
kernel-3.10.0-327.13.1.el7.x86_64
```

Un noyau se désinstalle comme tout autre paquet :

```
[root@centos7 ~]# yum remove kernel-3.10.0-327.el7.x86_64
Loaded plugins: fastestmirror, langpacks
Resolving Dependencies
--> Running transaction check
---> Package kernel.x86_64 0:3.10.0-327.el7 will be erased
--> Finished Dependency Resolution
```

Dependencies Resolved

```
=====
=====
Package                               Arch          Size          Version
Repository                             Size
=====
=====
Removing:
kernel                                x86_64        136 M         3.10.0-327.el7
@base/$releasever
=====
```

Transaction Summary

```
=====
=====
Remove 1 Package
```

```
Installed size: 136 M
Is this ok [y/N]: y
```

Installez le nouveau noyau avec la commande **rpm** :

```
[root@centos7 ~]# rpm -ivh --force --nodeps
/home/trainee/rpmbuild/RPMS/x86_64/kernel-3.10.0-327.13.1.el7.i2tch.x86_64.rpm
Preparing... ##### [100%]
```

```
Updating / installing...
 1:kernel-3.10.0-327.13.1.el7.i2tch ##### [100%]
```

Lister maintenant les noyaux installés :

```
[root@centos7 ~]# rpm -qa | grep kernel-3
kernel-3.10.0-327.13.1.el7.i2tch.x86_64
kernel-3.10.0-327.13.1.el7.x86_64
```

Constatez la création d'un nouveau grub.cfg :

```
[root@centos7 ~]# grep i2tch /boot/grub2/grub.cfg
menuentry 'CentOS Linux (3.10.0-327.13.1.el7.i2tch.x86_64) 7 (Core)' --class centos --class gnu-linux --class gnu
--class os --unrestricted $menuentry_id_option 'gnulinux-3.10.0-327.el7.x86_64-advanced-e65fe7da-cda8-4f5a-
a827-1b5cabe94bed' {
    linux16 /vmlinuz-3.10.0-327.13.1.el7.i2tch.x86_64 root=UUID=e65fe7da-cda8-4f5a-a827-1b5cabe94bed ro rhgb
    quiet LANG=en_GB.UTF-8
    initrd16 /initramfs-3.10.0-327.13.1.el7.i2tch.x86_64.img
```



**Important** : Re-démarrez votre VM en utilisant le nouveau noyau.

Vérifiez ensuite l'utilisation du nouveau noyau :

```
[root@centos7 ~]# uname -r
3.10.0-327.13.1.el7.i2tch.x86_64
```

## Gestion des Quotas

Sous Linux il est possible de mettre en place des quotas par utilisateur et par groupe. Ceci étant, Linux ne sait pas gérer des quotas par répertoire,

uniquement des quotas par partition. L'administrateur met souvent des quotas en place sur l'arborescence de /home pour limiter l'espace de stockage occupé par les utilisateurs.

Déconnectez-vous et reconnectez-vous en tant que root.

Avant de mettre en place des quotas, configurer SELINUX en mode **permissive** afin de ne pas avoir d'erreurs de ce dernier :

```
[root@centos7 ~]# getenforce
Enforcing
[root@centos7 ~]# setenforce permissive
[root@centos7 ~]# getenforce
Permissive
```

Editez ensuite le fichier /etc/sysconfig/selinux ainsi :

```
[root@centos7 ~]# vi /etc/sysconfig/selinux
[root@centos7 ~]# cat /etc/sysconfig/selinux

# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#   enforcing - SELinux security policy is enforced.
#   permissive - SELinux prints warnings instead of enforcing.
#   disabled - No SELinux policy is loaded.
SELINUX=permissive
# SELINUXTYPE= can take one of three two values:
#   targeted - Targeted processes are protected,
#   minimum - Modification of targeted policy. Only selected processes are protected.
#   mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

Commencez par vérifiez que le paquet **quota** est bien installé :

```
[root@centos7 ~]# rpm -qa | grep quota
quota-4.01-11.el7_2.1.x86_64
```

```
quota-nls-4.01-11.el7_2.1.noarch
```

Editez le fichier **/etc/fstab** en ajoutant les options **usrquota** et **grpquota** à la ligne **/home** :

```
[root@centos7 ~]# vi /etc/fstab
[root@centos7 ~]# cat /etc/fstab

#
# /etc/fstab
# Created by anaconda on Sat Apr 30 11:27:02 2016
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=e65fe7da-cda8-4f5a-a827-1b5cabe94bed /          xfs      defaults      0 0
UUID=2d947276-66e8-41f4-8475-b64b67d7a249 /boot      xfs      defaults      0 0
UUID=3181601a-7295-4ef0-a92c-f21f76b18e64 swap       swap     defaults      0 0
UUID=a080ac6a-d15c-48e2-8461-a7b1aa3ebf1a /home      ext4     defaults,usrquota,grpquota 1 2
```

Démontez puis remontez /home :

```
[root@centos7 ~]# umount /home
[root@centos7 ~]# mount -a
```

Déconnectez-vous et reconnectez-vous en tant que trainee. Vérifiez ensuite que les options soient prises en compte :

```
[root@centos7 ~]# cat /etc/mtab
rootfs / rootfs rw 0 0
sysfs /sys sysfs rw,seclabel,nosuid,nodev,noexec,relatime 0 0
proc /proc proc rw,nosuid,nodev,noexec,relatime 0 0
devtmpfs /dev devtmpfs rw,seclabel,nosuid,size=236036k,nr_inodes=59009,mode=755 0 0
securityfs /sys/kernel/security securityfs rw,nosuid,nodev,noexec,relatime 0 0
tmpfs /dev/shm tmpfs rw,seclabel,nosuid,nodev 0 0
devpts /dev/pts devpts rw,seclabel,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000 0 0
```

```
tmpfs /run tmpfs rw,seclabel,nosuid,nodev,mode=755 0 0
tmpfs /sys/fs/cgroup tmpfs ro,seclabel,nosuid,nodev,noexec,mode=755 0 0
cgroup /sys/fs/cgroup/systemd cgroup
rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/usr/lib/systemd/systemd-cgroups-agent,name=systemd 0 0
pstore /sys/fs/pstore pstore rw,nosuid,nodev,noexec,relatime 0 0
cgroup /sys/fs/cgroup/net_cls cgroup rw,nosuid,nodev,noexec,relatime,net_cls 0 0
cgroup /sys/fs/cgroup/memory cgroup rw,nosuid,nodev,noexec,relatime,memory 0 0
cgroup /sys/fs/cgroup/devices cgroup rw,nosuid,nodev,noexec,relatime,devices 0 0
cgroup /sys/fs/cgroup/hugetlb cgroup rw,nosuid,nodev,noexec,relatime,hugetlb 0 0
cgroup /sys/fs/cgroup/freezer cgroup rw,nosuid,nodev,noexec,relatime,freezer 0 0
cgroup /sys/fs/cgroup/blkio cgroup rw,nosuid,nodev,noexec,relatime,blkio 0 0
cgroup /sys/fs/cgroup/cpu,cpuacct cgroup rw,nosuid,nodev,noexec,relatime,cpuacct,cpu 0 0
cgroup /sys/fs/cgroup/perf_event cgroup rw,nosuid,nodev,noexec,relatime,perf_event 0 0
cgroup /sys/fs/cgroup/cpuset cgroup rw,nosuid,nodev,noexec,relatime,cpuset 0 0
configfs /sys/kernel/config configfs rw,relatime 0 0
/dev/sda2 / xfs rw,seclabel,relatime,attr2,inode64,noquota 0 0
selinuxfs /sys/fs/selinux selinuxfs rw,relatime 0 0
systemd-1 /proc/sys/fs/binfmt_misc autofs rw,relatime,fd=23,pgrp=1,timeout=300,minproto=5,maxproto=5,direct 0 0
debugfs /sys/kernel/debug debugfs rw,relatime 0 0
hugetlbfs /dev/hugepages hugetlbfs rw,seclabel,relatime 0 0
tmpfs /tmp tmpfs rw,seclabel 0 0
mqueue /dev/mqueue mqueue rw,seclabel,relatime 0 0
sunrpc /var/lib/nfs/rpc_pipefs rpc_pipefs rw,relatime 0 0
nfsd /proc/fs/nfsd nfsd rw,relatime 0 0
/dev/sda1 /boot xfs rw,seclabel,relatime,attr2,inode64,noquota 0 0
tmpfs /run/user/0 tmpfs rw,seclabel,nosuid,nodev,relatime,size=50080k,mode=700 0 0
/dev/sdb1 /home ext4 rw,seclabel,relatime,quota,usrquota,grpquota,data=ordered 0 0
```

## La Commande quotacheck

Pour activer les quotas sur /home, il convient d'utiliser la commande **quotacheck** :

```
[root@centos7 ~]# quotacheck -cugvm -f /dev/sdb1
```

```
quotacheck: Your kernel probably supports journaled quota but you are not using it. Consider switching to
journaled quota to avoid running quotacheck after an unclean shutdown.
quotacheck: Parcours de /dev/sdb1 [/home] terminé
quotacheck: Cannot stat old user quota file /home/aquota.user: Aucun fichier ou dossier de ce type. Usage will
not be subtracted.
quotacheck: Cannot stat old group quota file /home/aquota.group: Aucun fichier ou dossier de ce type. Usage will
not be subtracted.
quotacheck: Cannot stat old user quota file /home/aquota.user: Aucun fichier ou dossier de ce type. Usage will
not be subtracted.
quotacheck: Cannot stat old group quota file /home/aquota.group: Aucun fichier ou dossier de ce type. Usage will
not be subtracted.
quotacheck: Vérifié 100 répertoires et 230 fichiers
quotacheck: Ancien fichier non trouvé.
quotacheck: Ancien fichier non trouvé.
```

Les options de la commande quotacheck sont :

```
[root@centos7 ~]# quotacheck --help
Utility for checking and repairing quota files.
quotacheck [-gucbfinvdmMR] [-F <quota-format>] filesystem|-a

-u, --user           check user files
-g, --group          check group files
-c, --create-files   create new quota files
-b, --backup          create backups of old quota files
-f, --force          force check even if quotas are enabled
-i, --interactive    interactive mode
-n, --use-first-dquot use the first copy of duplicated structure
-v, --verbose        print more information
-d, --debug          print even more messages
-m, --no-remount     do not remount filesystem read-only
-M, --try-remount    try remounting filesystem read-only,
                    continue even if it fails
-R, --exclude-root   exclude root when checking all filesystems
```

```
-F, --format=formatname  check quota files of specific format
-a, --all                check all filesystems
-h, --help              display this message and exit
-V, --version            display version information and exit
```

Rapports de bugs à [jack@suse.cz](mailto:jack@suse.cz)

Les quotas ont été activés et les fichiers **aquota.user** et **aquota.group** ont été créés dans le répertoire /home :

```
[root@centos7 ~]# ls -la /home
total 44
drwxr-xr-x.  4 root    root    4096 11 août  13:39 .
dr-xr-xr-x. 18 root    root    4096 11 août  13:27 ..
-rw-----.  1 root    root    7168 11 août  13:39 aquota.group
-rw-----.  1 root    root    7168 11 août  13:39 aquota.user
drwx-----.  2 root    root   16384 11 août  13:26 lost+found
drwx-----. 14 trainee trainee 4096 30 avril 15:29 trainee
```

Créez maintenant un utilisateur **fenestros** avec le mot de passe **fenestros** :

```
[root@centos7 ~]# groupadd fenestros && useradd fenestros -c Fenestr0s -d /home/fenestros -g fenestros -s /bin/bash
[root@centos7 ~]# passwd fenestros
Changement de mot de passe pour l'utilisateur fenestros.
Nouveau mot de passe : fenestros
MOT DE PASSE INCORRECT : Le mot de passe contient le nom d'utilisateur sous une forme
Retapez le nouveau mot de passe : fenestros
passwd : mise à jour réussie de tous les jetons d'authentification.
[root@centos7 ~]#
```

## La Commande edquota



Mettez en place maintenant un quota de 10Mo pour l'utilisateur **fenestros** :

```
[root@centos ~]# edquota -u fenestros -f /home
```

L'éditeur **vi** se lance et vous obtiendrez un résultat similaire à celui-ci :

```
Quotas disque pour user fenestros (uid 1001) :
Système de fichiers      blocs      souple      stricte      inodes      souple      stricte
/dev/sdb1                 0          0          0           0           0           0
```

Modifiez ce fichier ainsi :

```
Quotas disque pour user fenestros (uid 1001) :
Système de fichiers      blocs      souple      stricte      inodes      souple      stricte
/dev/sdb1                 0        8000        10000         0           0           0
```

Les options de la commande **edquota** sont :

```
[root@centos7 ~]# edquota --help
edquota: Usage:
    edquota [-rm] [-u] [-F formatname] [-p username] [-f filesystem] username ...
    edquota [-rm] -g [-F formatname] [-p groupname] [-f filesystem] groupname ...
    edquota [-u|g] [-F formatname] [-f filesystem] -t
    edquota [-u|g] [-F formatname] [-f filesystem] -T username|groupname ...

-u, --user                edit user data
-g, --group                edit group data
-r, --remote              edit remote quota (via RPC)
-m, --no-mixed-pathnames  trim leading slashes from NFSv4 mountpoints
-F, --format=formatname   edit quotas of a specific format
-p, --prototype=name      copy data from a prototype user/group
    --always-resolve       always try to resolve name, even if it is
                           composed only of digits
-f, --filesystem=filesystem edit data only on a specific filesystem
```

```
-t, --edit-period      edit grace period
-T, --edit-times       edit grace time of a user/group
-h, --help             display this help text and exit
-V, --version          display version information and exit
```

Rapports de bugs à : [jack@suse.cz](mailto:jack@suse.cz)



Pour mettre en place un quota par group, la procédure est similaire. Il suffit d'utiliser l'option -g de la commande edquota.

## La Commande quotaon

Appliquez maintenant les quotas :

```
[root@centos7 ~]# quotaon -a
```

Les options de la commande **quotaon** sont :

```
[root@centos7 ~]# quotaon --help
quotaon: Usage:
    quotaon [-guvp] [-F quotaformat] [-x state] -a
    quotaon [-guvp] [-F quotaformat] [-x state] filesystems ...

-a, --all                turn quotas on for all filesystems
-f, --off                turn quotas off
-u, --user               operate on user quotas
-g, --group              operate on group quotas
-p, --print-state        print whether quotas are on or off
-x, --xfs-command=cmd    perform XFS quota command
-F, --format=formatname  operate on specific quota format
-v, --verbose            print more messages
```

|               |                                      |
|---------------|--------------------------------------|
| -h, --help    | display this help text and exit      |
| -V, --version | display version information and exit |

De cette manière vous avez mis en place un quota **souple** pour fenestros de 8 000 Ko et un quota **stricte** de 10 000 Ko.

Quand l'utilisateur fenestros aura dépassé le quota **souple**, il recevra un message d'avertissement. Quand il dépasse le quota **stricte**, il ne pourra plus enregistrer dans /home, sauf dans le cas où il supprime des fichiers pour retomber en dessous de la limite **stricte**.

Il est à noter que vous pouvez soit mettre en place un quota en taille, soit mettre en place un quota basé sur le nombre d'inodes utilisés par l'utilisateur.



La commande pour désactiver les quotas est **quotaoff**.

## La Commande repquota

Pour visualiser les quotas utilisez la commande **repquota** :

```
[root@centos7 ~]# repquota /home
*** Rapport pour les quotas user sur le périphérique /dev/sdb1
Période de sursis bloc : 7days ; période de sursis inode : 7days
                Block limits                File limits
Utilisateur      utilisé souple stricte sursis utilisé souple stricte sursis
-----
root      --      20      0      0              2      0      0
trainee   --    20484      0      0             328      0      0
```



Notez que l'utilisateur fenestros ne figure pas dans la liste. Sous CentOS, le quota n'est pas visible tant que l'utilisateur ne s'est pas connecté pour la première fois. Notez aussi les période de grâce de **7** jours.

Les options de la commande **repquota** sont :

```
[root@centos7 ~]# repquota --help
repquota: Utility for reporting quotas.
Usage:
repquota [-vugsi] [-c|C] [-t|n] [-F quotaformat] (-a | mntpoint)

-v, --verbose           display also users/groups without any usage
-u, --user              display information about users
-g, --group             display information about groups
-s, --human-readable    show numbers in human friendly units (MB, GB, ...)
-t, --truncate-names    truncate names to 9 characters
-p, --raw-grace         print grace time in seconds since epoch
-n, --no-names          do not translate uid/gid to name
-i, --no-autofs         avoid autofs mountpoints
-c, --cache             translate big number of ids at once
-C, --no-cache          translate ids one by one
-F, --format=formatname report information for specific format
-a, --all               report information for all mount points with quotas
-h, --help              display this help message and exit
-V, --version           display version information and exit
```

Rapports de bugs à [jack@suse.cz](mailto:jack@suse.cz)

## La Commande quota

Pour visualiser les quotas d'un utilisateur spécifique, il convient d'utiliser la commande **quota** :

```
[root@centos7 ~]# quota fenestros
Disk quotas for user fenestros (uid 1001): aucun
[root@centos7 ~]# su - fenestros
[fenestros@centos7 ~]$ touch test
[fenestros@centos7 ~]$ exit
```

```
logout
[root@centos7 ~]# quota fenestros
Disk quotas for user fenestros (uid 1001):
Système fichiers  blocs  quota  limite  sursisfichiers  quota  limite  sursis
/dev/sdb1        24    8000   10000          7         0       0
```

Les options de la commande **quota** sont :

```
[root@centos7 ~]# quota --help
quota: Usage: quota [-guqvswim] [-l | [-Q | -A]] [-F quotaformat]
    quota [-qvswim] [-l | [-Q | -A]] [-F quotaformat] -u username ...
    quota [-qvswim] [-l | [-Q | -A]] [-F quotaformat] -g groupname ...
    quota [-qvswugQm] [-F quotaformat] -f filesystem ...

-u, --user                display quota for user
-g, --group                display quota for group
-q, --quiet                print more terse message
-v, --verbose              print more verbose message
-s, --human-readable       display numbers in human friendly units (MB, GB...)
    --always-resolve        always try to translate name to id, even if it is
                           composed of only digits
-w, --no-wrap              do not wrap long lines
-p, --raw-grace             print grace time in seconds since epoch
-l, --local-only            do not query NFS filesystems
-Q, --quiet-refuse          do not print error message when NFS server does
                           not respond
-i, --no-autofs             do not query autofs mountpoints
-F, --format=formatname     display quota of a specific format
-f, --filesystem-list       display quota information only for given filesystems
-A, --all-nfs               display quota for all NFS mountpoints
-m, --no-mixed-pathnames    trim leading slashes from NFSv4 mountpoints
    --show-mntpoint          show mount point of the file system in output
    --hide-device            do not show file system device in output
-h, --help                  display this help message and exit
```

```
-V, --version          display version information and exit
```

Rapports de bugs à : [jack@suse.cz](mailto:jack@suse.cz)

## La Commande warnquota

La commande **warnquota** vérifie le ou les disques et envoie un message par mail à tout utilisateur qui a dépassé la limite soft. Elle est enrègle générale appelée par un job cron. Cependant elle peut aussi est appelée d'une manière interactive.

Sous RHEL/CentOS 7, warnquota n'est pas installé par défaut :

```
[root@centos7 ~]# yum install quota-warnquota
Modules complémentaires chargés : fastestmirror, langpacks
base
| 3.6 kB  00:00:00
extras
| 3.4 kB  00:00:00
updates
| 3.4 kB  00:00:00
Loading mirror speeds from cached hostfile
* base: centos.quelquesmots.fr
* extras: miroir.univ-paris13.fr
* updates: miroir.univ-paris13.fr
Résolution des dépendances
--> Lancement de la transaction de test
---> Le paquet quota-warnquota.x86_64 1:4.01-11.el7_2.1 sera installé
--> Résolution des dépendances terminée
```

Dépendances résolues

```
=====
=====
```

| Package | Architecture | Version |
|---------|--------------|---------|
|---------|--------------|---------|

```

Dépôt                               Taille
=====
Installation :
quota-warnquota                     x86_64                     1:4.01-11.el7_2.1
updates                             76 k

Résumé de la transaction
=====
=====
Installation    1 Paquet

Taille totale des téléchargements : 76 k
Taille d'installation : 137 k
Is this ok [y/d/N]: y

```

Les options de la commande **warnquota** sont :

```

[root@centos7 ~]# warnquota --help
warnquota: Usage:
  warnquota [-ugsid] [-F quotaformat] [-c configfile] [-q quotatabfile] [-a adminsfile] [filesystem...]

-u, --user                warn users
-g, --group               warn groups
-s, --human-readable      send information in more human friendly units
-i, --no-autofs           avoid autofs mountpoints
-d, --no-details          do not send quota information itself
-F, --format=formatname   use quotafiles of specific format
-c, --config=config-file  non-default config file
-q, --quota-tab=quotatab-file non-default quotatab
-a, --admins-file=admins-file non-default admins file
-h, --help                display this help message and exit
-v, --version             display version information and exit

```

Rapports de bugs à [jack@suse.cz](mailto:jack@suse.cz)

---

Copyright © 2023 Hugh Norris.

---