Dernière mise-à-jour : 2017/02/12 16:03

LRF111 - Gestion de l'Archivage et de la Compression

Archivage

Préparation

Afin de poursuivre, il convient de créer une arborescence à sauvegarder :

```
[root@centos7 ~]# mkdir -p /test/repY; mkdir /test/repZ
[root@centos7 ~]# cd /test/repY; touch Y1 Y2 Y3
[root@centos7 repY]#  cd /test/repZ; touch Z1 Z2
[root@centos7 repZ]# ls -lR /test
/test:
total 0
drwxr-xr-x. 2 root root 33 Oct 27 11:24 repY
drwxr-xr-x. 2 root root 24 Oct 27 11:25 repZ

/test/repY:
total 0
-rw-r--r--. 1 root root 0 Oct 27 11:24 Y1
-rw-r--r--. 1 root root 0 Oct 27 11:24 Y2
-rw-r--r--. 1 root root 0 Oct 27 11:24 Y3

/test/repZ:
total 0
-rw-r--r--. 1 root root 0 Oct 27 11:25 Z1
-rw-r--r--. 1 root root 0 Oct 27 11:25 Z2
```

La Commande tar

Présentation

Le programme **tar** a été originellement prévu pour sauvegarder sur des bandes magnétiques, d'où son nom issu de **tape archiver**.

La commande **tar** peut sauvegarder vers :

- un fichier spécial, par exemple le nom d'un lecteur de bande,
- un fichier ordinaire sur disque,
- la sortie standard pour être utilisé dans un pipe.

Options de la Commande

Les options de la commande tar sont :

```
[root@centos7 repZ]# tar --help
Usage: tar [OPTION...] [FILE]...
GNU `tar' saves many files together into a single tape or disk archive, and can
restore individual files from the archive.

Examples:
  tar -cf archive.tar foo bar  # Create archive.tar from files foo and bar.
  tar -tvf archive.tar         # List all files in archive.tar verbosely.
  tar -xf archive.tar          # Extract all files from archive.tar.

 Main operation mode:

  -A, --catenate, --concatenate   append tar files to an archive
  -c, --create               create a new archive
  -d, --diff, --compare      find differences between archive and file system
      --delete               delete from the archive (not on mag tapes!)
```

```
 -r, --append               append files to the end of an archive
 -t, --list                 list the contents of an archive
     --test-label           test the archive volume label and exit
 -u, --update               only append files newer than copy in archive
 -x, --extract, --get       extract files from an archive

Operation modifiers:

     --check-device         check device numbers when creating incremental
                            archives (default)
 -g, --listed-incremental=FILE   handle new GNU-format incremental backup
 -G, --incremental          handle old GNU-format incremental backup
     --ignore-failed-read   do not exit with nonzero on unreadable files
     --level=NUMBER         dump level for created listed-incremental archive
 -n, --seek                 archive is seekable
     --no-check-device      do not check device numbers when creating
                            incremental archives
     --no-seek              archive is not seekable
     --occurrence[=NUMBER]  process only the NUMBERth occurrence of each file
                            in the archive; this option is valid only in
                            conjunction with one of the subcommands --delete,
                            --diff, --extract or --list and when a list of
                            files is given either on the command line or via
                            the -T option; NUMBER defaults to 1
     --sparse-version=MAJOR[.MINOR]
                            set version of the sparse format to use (implies
                            --sparse)
 -S, --sparse               handle sparse files efficiently

Overwrite control:

 -k, --keep-old-files       don't replace existing files when extracting,
                            treat them as errors
     --keep-newer-files     don't replace existing files that are newer than
```

```
                           their archive copies
     --no-overwrite-dir    preserve metadata of existing directories
     --overwrite           overwrite existing files when extracting
     --overwrite-dir       overwrite metadata of existing directories when
                           extracting (default)
     --recursive-unlink    empty hierarchies prior to extracting directory
     --remove-files        remove files after adding them to the archive
     --skip-old-files      don't replace existing files when extracting,
                           silently skip over them
 -U, --unlink-first        remove each file prior to extracting over it
 -W, --verify              attempt to verify the archive after writing it

Select output stream:

     --ignore-command-error ignore exit codes of children
     --no-ignore-command-error   treat non-zero exit codes of children as
                           error
 -O, --to-stdout           extract files to standard output
     --to-command=COMMAND  pipe extracted files to another program

Handling of file attributes:

     --atime-preserve[=METHOD]   preserve access times on dumped files, either
                           by restoring the times after reading
                           (METHOD='replace'; default) or by not setting the
                           times in the first place (METHOD='system')
     --delay-directory-restore   delay setting modification times and
                           permissions of extracted directories until the end
                           of extraction
     --group=NAME          force NAME as group for added files
     --mode=CHANGES        force (symbolic) mode CHANGES for added files
     --mtime=DATE-OR-FILE  set mtime for added files from DATE-OR-FILE
 -m, --touch               don't extract file modified time
     --no-delay-directory-restore
```

```
                           cancel the effect of --delay-directory-restore
                           option
     --no-same-owner       extract files as yourself (default for ordinary
                           users)
     --no-same-permissions  apply the user's umask when extracting permissions
                           from the archive (default for ordinary users)
     --numeric-owner       always use numbers for user/group names
     --owner=NAME          force NAME as owner for added files
 -p, --preserve-permissions, --same-permissions
                           extract information about file permissions
                           (default for superuser)
     --preserve            same as both -p and -s
     --same-owner          try extracting files with the same ownership as
                           exists in the archive (default for superuser)
 -s, --preserve-order, --same-order
                           sort names to extract to match archive

Handling of extended file attributes:

     --acls                Enable the POSIX ACLs support
     --no-acls             Disable the POSIX ACLs support
     --no-selinux          Disable the SELinux context support
     --no-xattrs           Disable extended attributes support
     --selinux             Enable the SELinux context support
     --xattrs              Enable extended attributes support
     --xattrs-exclude=MASK  specify the exclude pattern for xattr keys
     --xattrs-include=MASK  specify the include pattern for xattr keys

Device selection and switching:

 -f, --file=ARCHIVE        use archive file or device ARCHIVE
     --force-local         archive file is local even if it has a colon
 -F, --info-script=NAME, --new-volume-script=NAME
                           run script at end of each tape (implies -M)
```

```
 -L, --tape-length=NUMBER   change tape after writing NUMBER x 1024 bytes
 -M, --multi-volume         create/list/extract multi-volume archive
     --rmt-command=COMMAND  use given rmt COMMAND instead of rmt
     --rsh-command=COMMAND  use remote COMMAND instead of rsh
     --volno-file=FILE      use/update the volume number in FILE

Device blocking:

 -b, --blocking-factor=BLOCKS   BLOCKS x 512 bytes per record
 -B, --read-full-records    reblock as we read (for 4.2BSD pipes)
 -i, --ignore-zeros         ignore zeroed blocks in archive (means EOF)
     --record-size=NUMBER   NUMBER of bytes per record, multiple of 512

Archive format selection:

 -H, --format=FORMAT        create archive of the given format

FORMAT is one of the following:

   gnu                      GNU tar 1.13.x format
   oldgnu                   GNU format as per tar <= 1.12
   pax                      POSIX 1003.1-2001 (pax) format
   posix                    same as pax
   ustar                    POSIX 1003.1-1988 (ustar) format
   v7                       old V7 tar format

     --old-archive, --portability
                            same as --format=v7
     --pax-option=keyword[[:]=value][,keyword[[:]=value]]...
                            control pax keywords
     --posix                same as --format=posix
 -V, --label=TEXT           create archive with volume name TEXT; at
                            list/extract time, use TEXT as a globbing pattern
                            for volume name
```

```
Compression options:

 -a, --auto-compress        use archive suffix to determine the compression
                            program
 -I, --use-compress-program=PROG
                            filter through PROG (must accept -d)
 -j, --bzip2                filter the archive through bzip2
 -J, --xz                   filter the archive through xz
     --lzip                 filter the archive through lzip
     --lzma                 filter the archive through lzma
     --lzop
     --no-auto-compress     do not use archive suffix to determine the
                            compression program
 -z, --gzip, --gunzip, --ungzip   filter the archive through gzip
 -Z, --compress, --uncompress   filter the archive through compress

Local file selection:

     --add-file=FILE        add given FILE to the archive (useful if its name
                            starts with a dash)
     --backup[=CONTROL]     backup before removal, choose version CONTROL
 -C, --directory=DIR        change to directory DIR
     --exclude=PATTERN      exclude files, given as a PATTERN
     --exclude-backups      exclude backup and lock files
     --exclude-caches       exclude contents of directories containing
                            CACHEDIR.TAG, except for the tag file itself
     --exclude-caches-all   exclude directories containing CACHEDIR.TAG
     --exclude-caches-under exclude everything under directories containing
                            CACHEDIR.TAG
     --exclude-tag=FILE     exclude contents of directories containing FILE,
                            except for FILE itself
     --exclude-tag-all=FILE exclude directories containing FILE
     --exclude-tag-under=FILE   exclude everything under directories
                            containing FILE
```

```
      --exclude-vcs          exclude version control system directories
  -h, --dereference          follow symlinks; archive and dump the files they
                             point to
      --hard-dereference     follow hard links; archive and dump the files they
                             refer to
  -K, --starting-file=MEMBER-NAME
                             begin at member MEMBER-NAME in the archive
      --newer-mtime=DATE     compare date and time when data changed only
      --no-null              disable the effect of the previous --null option
      --no-recursion         avoid descending automatically in directories
      --no-unquote           do not unquote filenames read with -T
      --null                 -T reads null-terminated names, disable -C
  -N, --newer=DATE-OR-FILE, --after-date=DATE-OR-FILE
                             only store files newer than DATE-OR-FILE
      --one-file-system      stay in local file system when creating archive
  -P, --absolute-names       don't strip leading `/'s from file names
      --recursion            recurse into directories (default)
      --suffix=STRING        backup before removal, override usual suffix ('~'
                             unless overridden by environment variable
                             SIMPLE_BACKUP_SUFFIX)
  -T, --files-from=FILE      get names to extract or create from FILE
      --unquote              unquote filenames read with -T (default)
  -X, --exclude-from=FILE    exclude patterns listed in FILE

File name transformations:

      --strip-components=NUMBER   strip NUMBER leading components from file
                             names on extraction
      --transform=EXPRESSION, --xform=EXPRESSION
                             use sed replace EXPRESSION to transform file
                             names

File name matching options (affect both exclude and include patterns):
```

```
      --anchored              patterns match file name start
      --ignore-case           ignore case
      --no-anchored           patterns match after any `/' (default for
                              exclusion)
      --no-ignore-case        case sensitive matching (default)
      --no-wildcards          verbatim string matching
      --no-wildcards-match-slash   wildcards do not match `/'
      --wildcards             use wildcards (default)
      --wildcards-match-slash   wildcards match `/' (default for exclusion)

Informative output:

      --checkpoint[=NUMBER]  display progress messages every NUMBERth record
                              (default 10)
      --checkpoint-action=ACTION   execute ACTION on each checkpoint
      --full-time             print file time to its full resolution
      --index-file=FILE       send verbose output to FILE
  -l, --check-links           print a message if not all links are dumped
      --no-quote-chars=STRING   disable quoting for characters from STRING
      --quote-chars=STRING    additionally quote characters from STRING
      --quoting-style=STYLE   set name quoting style; see below for valid STYLE
                              values
  -R, --block-number          show block number within archive with each message
      --show-defaults         show tar defaults
      --show-omitted-dirs     when listing or extracting, list each directory
                              that does not match search criteria
      --show-transformed-names, --show-stored-names
                              show file or archive names after transformation
      --totals[=SIGNAL]       print total bytes after processing the archive;
                              with an argument - print total bytes when this
                              SIGNAL is delivered; Allowed signals are: SIGHUP,
                              SIGQUIT, SIGINT, SIGUSR1 and SIGUSR2; the names
                              without SIG prefix are also accepted
      --utc                   print file modification times in UTC
```

```
  -v, --verbose              verbosely list files processed
      --warning=KEYWORD      warning control
  -w, --interactive, --confirmation
                             ask for confirmation for every action

 Compatibility options:

  -o                         when creating, same as --old-archive; when
                             extracting, same as --no-same-owner

 Other options:

  -?, --help                 give this help list
      --restrict             disable use of some potentially harmful options
      --usage                give a short usage message
      --version              print program version

Mandatory or optional arguments to long options are also mandatory or optional
for any corresponding short options.

The backup suffix is `~', unless set with --suffix or SIMPLE_BACKUP_SUFFIX.
The version control may be set with --backup or VERSION_CONTROL, values are:

  none, off       never make backups
  t, numbered     make numbered backups
  nil, existing   numbered if numbered backups exist, simple otherwise
  never, simple   always make simple backups

Valid arguments for the --quoting-style option are:

  literal
  shell
  shell-always
  c
```

```
  c-maybe
  escape
  locale
  clocale

*This* tar defaults to:
--format=gnu -f- -b20 --quoting-style=escape --rmt-command=/etc/rmt
--rsh-command=/usr/bin/ssh

Report bugs to <bug-tar@gnu.org>.
```

LAB #1 - Travailler avec la Commande tar

Vous allez maintenant sauvegarder votre dossier **test** ainsi que son contenu vers un fichier :

```
[root@centos7 repZ]# tar cvf /tmp/test.tar /test
tar: Removing leading `/' from member names
/test/
/test/repY/
/test/repY/Y1
/test/repY/Y2
/test/repY/Y3
/test/repZ/
/test/repZ/Z1
/test/repZ/Z2
```

Pour visualiser la **table of contents** de votre sauvegarde, utilisez la commande suivante :

```
[root@centos7 repZ]# tar tvf /tmp/test.tar
drwxr-xr-x root/root         0 2015-10-27 11:24 test/
drwxr-xr-x root/root         0 2015-10-27 11:24 test/repY/
-rw-r--r-- root/root         0 2015-10-27 11:24 test/repY/Y1
```

```
-rw-r--r-- root/root         0 2015-10-27 11:24 test/repY/Y2
-rw-r--r-- root/root         0 2015-10-27 11:24 test/repY/Y3
drwxr-xr-x root/root         0 2015-10-27 11:25 test/repZ/
-rw-r--r-- root/root         0 2015-10-27 11:25 test/repZ/Z1
-rw-r--r-- root/root         0 2015-10-27 11:25 test/repZ/Z2
```

Afin de créer une sauvegarde incrémentale, vous avez besoin de créer un fichier qui servira de référence de date :

```
[root@centos7 repZ]# touch /tmp/dateref
```

Modifiez maintenant deux des fichiers de votre arborescence **test** :

```
[root@centos7 repZ]# echo "CentOS est super \!" > /test/repY/Y1
[root@centos7 repZ]# echo "RHEL is wonderful \!" > /test/repZ/Z1
```

Pour procéder à votre sauvegarde incrémentale, vous devez sauvegarder uniquement les fichiers modifiés ou créés depuis la création de votre fichier **/tmp/dateref**.

Saisissez donc la commande suivante :

```
[root@centos7 repZ]# tar -cvf /tmp/incremental.tar -N /tmp/dateref /test
tar: Removing leading `/' from member names
/test/
/test/repY/
/test/repY/Y1
tar: /test/repY/Y2: file is unchanged; not dumped
tar: /test/repY/Y3: file is unchanged; not dumped
/test/repZ/
/test/repZ/Z1
tar: /test/repZ/Z2: file is unchanged; not dumped
```

Important - Notez l'utilisation de l'option **-N** avec l’argument **/tmp/dateref** qui permet d'identifier les fichiers modifiés ou créés depuis la

création de **/tmp/dateref**.

Contrôlez maintenant le contenu de l'archive **/tmp/incremental.tar** :

```
[root@centos7 repZ]# tar tvf /tmp/incremental.tar
drwxr-xr-x root/root         0 2015-10-27 11:24 test/
drwxr-xr-x root/root         0 2015-10-27 11:24 test/repY/
-rw-r--r-- root/root        20 2015-10-27 11:29 test/repY/Y1
drwxr-xr-x root/root         0 2015-10-27 11:25 test/repZ/
-rw-r--r-- root/root        21 2015-10-27 11:29 test/repZ/Z1
```

Supprimez maintenant le contenu du répertoire **test** :

```
[root@centos repZ]# rm -rf /test/*
```

Important - Notez que le système vous permet de supprimer le répertoire **/test/repZ**, or vous vous situez dans ce même répertoire !

Afin de pouvoir restaurer les fichiers de votre première sauvegarde, placez-vous à la racine de votre système et restaurez le contenu de votre répertoire **test** en saisissant la commande tar suivante :

```
[root@centos7 repZ]# cd /
[root@centos7 /]# tar xvf /tmp/test.tar
test/
test/repY/
test/repY/Y1
test/repY/Y2
test/repY/Y3
test/repZ/
test/repZ/Z1
```

```
test/repZ/Z2
```

Constatez maintenant que l'opération s'est bien déroulée :

```
[root@centos7 /]# ls -lR /test
/test:
total 0
drwxr-xr-x. 2 root root 33 Oct 27 11:24 repY
drwxr-xr-x. 2 root root 24 Oct 27 11:25 repZ

/test/repY:
total 0
-rw-r--r--. 1 root root 0 Oct 27 11:24 Y1
-rw-r--r--. 1 root root 0 Oct 27 11:24 Y2
-rw-r--r--. 1 root root 0 Oct 27 11:24 Y3

/test/repZ:
total 0
-rw-r--r--. 1 root root 0 Oct 27 11:25 Z1
-rw-r--r--. 1 root root 0 Oct 27 11:25 Z2
```

Important - Notez qu'à ce stade les fichiers **/test/repY/Y1** et **/test/repZ/Z1** sont vides.

Restaurez maintenant votre archive incrémentale :

```
[root@centos7 /]# tar xvf /tmp/incremental.tar
test/
test/repY/
test/repY/Y1
test/repZ/
```

```
test/repZ/Z1
```

Constatez maintenant que l'opération s'est bien déroulée :

```
[root@centos7 /]# ls -lR /test
/test:
total 0
drwxr-xr-x. 2 root root 33 Oct 27 11:24 repY
drwxr-xr-x. 2 root root 24 Oct 27 11:25 repZ

/test/repY:
total 4
-rw-r--r--. 1 root root 20 Oct 27 11:29 Y1
-rw-r--r--. 1 root root  0 Oct 27 11:24 Y2
-rw-r--r--. 1 root root  0 Oct 27 11:24 Y3

/test/repZ:
total 4
-rw-r--r--. 1 root root 21 Oct 27 11:29 Z1
-rw-r--r--. 1 root root  0 Oct 27 11:25 Z2
```

Important - Notez que les fichiers **/test/repY/Y1** et **/test/repZ/Z1** sont maintenant non-vides.

La Commande GPL tar et la Compression

Dernièrement, la commande tar peut archiver en utilisant des algorithmes de compression :

Algorythme	Option de la commande tar
gzip	z

Algorythme	Option de la commande tar
bzip2	j
lzma	J

La Commande cpio

Présentation

La commande **cpio** (Copy Input To Output). cpio peut gérer les archives au format **tar**. La différence majeure entre tar et cpio est que ce dernier stocke les chemins d'accès aux fichiers sauvgardés en même temps que les fichiers eux-mêmes. Ceci implique que dans le cas où le chemin absolu a été spécifié lors de la sauvegarde, il est impossible de restaurer un fichier à un autre emplacement que son emplacement d'origine.

Vous allez utiliser maintenant le logiciel **cpio** pour effectuer les sauvegardes et restaurations.

Options de la Commande

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

```
[root@centos7 /]# cpio --help
Usage: cpio [OPTION...] [destination-directory]
GNU `cpio' copies files to and from archives

Examples:
  # Copy files named in name-list to the archive
  cpio -o < name-list [> archive]
  # Extract files from the archive
  cpio -i [< archive]
  # Copy files named in name-list to destination-directory
  cpio -p destination-directory < name-list

 Main operation mode:
```

```
 -i, --extract              Extract files from an archive (run in copy-in
                            mode)
 -o, --create               Create the archive (run in copy-out mode)
 -p, --pass-through         Run in copy-pass mode
 -t, --list                 Print a table of contents of the input

Operation modifiers valid in any mode:

     --block-size=BLOCK-SIZE   Set the I/O block size to BLOCK-SIZE * 512
                            bytes
 -B                         Set the I/O block size to 5120 bytes
 -c                         Identical to "-H newc", use the new (SVR4)
                            portable format.If you wish the old portable
                            (ASCII) archive format, use "-H odc" instead.
 -C, --io-size=NUMBER       Set the I/O block size to the given NUMBER of
                            bytes
     --force-local          Archive file is local, even if its name contains
                            colons
 -f, --nonmatching          Only copy files that do not match any of the given
                            patterns
 -F, --file=[[USER@]HOST:]FILE-NAME
                            Use this FILE-NAME instead of standard input or
                            output. Optional USER and HOST specify the user
                            and host names in case of a remote archive
 -H, --format=FORMAT        Use given archive FORMAT
 -M, --message=STRING       Print STRING when the end of a volume of the
                            backup media is reached
 -n, --numeric-uid-gid      In the verbose table of contents listing, show
                            numeric UID and GID
     --quiet                Do not print the number of blocks copied
     --rsh-command=COMMAND  Use remote COMMAND instead of rsh
 -v, --verbose              Verbosely list the files processed
 -V, --dot                  Print a "." for each file processed
 -W, --warning=FLAG         Control warning display. Currently FLAG is one of
```

```
                            'none', 'truncate', 'all'. Multiple options
                            accumulate.

Operation modifiers valid only in copy-in mode:

 -b, --swap                 Swap both halfwords of words and bytes of
                            halfwords in the data. Equivalent to -sS
 -r, --rename               Interactively rename files
 -s, --swap-bytes           Swap the bytes of each halfword in the files
 -S, --swap-halfwords       Swap the halfwords of each word (4 bytes) in the
                            files
     --to-stdout            Extract files to standard output

 -E, --pattern-file=FILE    Read additional patterns specifying filenames to
                            extract or list from FILE
     --only-verify-crc      When reading a CRC format archive, only verify the
                            checksum of each file in the archive, don't
                            actually extract the files

Operation modifiers valid only in copy-out mode:

 -A, --append               Append to an existing archive.
 -O [[USER@]HOST:]FILE-NAME Archive filename to use instead of standard
                            output. Optional USER and HOST specify the user
                            and host names in case of a remote archive

Operation modifiers valid only in copy-pass mode:

 -l, --link                 Link files instead of copying them, when
                            possible

Operation modifiers valid in copy-in and copy-out modes:

     --absolute-filenames   Do not strip file system prefix components from
```

```
                              the file names
      --no-absolute-filenames   Create all files relative to the current
                              directory

 Operation modifiers valid in copy-out and copy-pass modes:

  -0, --null                  A list of filenames is terminated by a null
                              character instead of a newline
  -a, --reset-access-time     Reset the access times of files after reading
                              them
  -I [[USER@]HOST:]FILE-NAME Archive filename to use instead of standard input.
                              Optional USER and HOST specify the user and host
                              names in case of a remote archive
  -L, --dereference           Dereference  symbolic  links  (copy  the files
                              that they point to instead of copying the links).
  -R, --owner=[USER][:.][GROUP]   Set the ownership of all files created to the
                              specified USER and/or GROUP

 Operation modifiers valid in copy-in and copy-pass modes:

  -d, --make-directories      Create leading directories where needed
  -m, --preserve-modification-time
                              Retain previous file modification times when
                              creating files
      --no-preserve-owner     Do not change the ownership of the files
      --sparse                Write files with large blocks of zeros as sparse
                              files
  -u, --unconditional         Replace all files unconditionally

  -?, --help                  give this help list
      --usage                 give a short usage message
      --version               print program version

Mandatory or optional arguments to long options are also mandatory or optional
```

```
for any corresponding short options.

Report bugs to <bug-cpio@gnu.org>.
```

LAB #2 - Travailler avec la Commande cpio

Dans un premier temps, vous devez utiliser la commande **find** pour construire une liste de fichiers à sauvegarder :

```
[root@centos7 /]# find /test > /tmp/cpio.liste
[root@centos7 /]# cat /tmp/cpio.liste
/test
/test/repY
/test/repY/Y2
/test/repY/Y3
/test/repY/Y1
/test/repZ
/test/repZ/Z2
/test/repZ/Z1
```

Sauvegardez maintenant les fichiers et répertoires référencés par le fichier **/tmp/cpio.liste** :

```
[root@centos7 /]# cpio -ov < /tmp/cpio.liste > /tmp/test.cpio
/test
/test/repY
/test/repY/Y2
/test/repY/Y3
/test/repY/Y1
/test/repZ
/test/repZ/Z2
/test/repZ/Z1
1 block
```

Consultez maintenant la **table of contents** de votre sauvegarde :

```
[root@centos7 /]# cpio -it < /tmp/test.cpio
/test
/test/repY
/test/repY/Y2
/test/repY/Y3
/test/repY/Y1
/test/repZ
/test/repZ/Z2
/test/repZ/Z1
1 block
```

Supprimez maintenant le répertoire **/test/repY** et son contenu :

```
[root@centos7 /]# rm -rf /test/repY
```

Contrôlez le bon déroulement de la suppression :

```
[root@centos7 /]# ls -lR /test
/test:
total 0
drwxr-xr-x. 2 root root 24 Oct 27 11:25 repZ

/test/repZ:
total 4
-rw-r--r--. 1 root root 21 Oct 27 11:29 Z1
-rw-r--r--. 1 root root  0 Oct 27 11:25 Z2
```

Restaurez les fichiers supprimés :

```
[root@centos7 /]# cpio -ivdum "/test/repY/*" < /tmp/test.cpio
/test/repY/Y2
/test/repY/Y3
```

```
/test/repY/Y1
1 block
```

Important - Notez l'utilisation de la chaîne **“/test/repY/*”** qui permet de rechercher uniquement le répertoire **repY** ainsi que les fichiers **Y1**, **Y2** et **Y3** dans l'archive test.cpio.

Contrôlez le bon déroulement de la restauration :

```
[root@centos7 /]# ls -lR /test
/test:
total 0
drwxr-xr-x. 2 root root 33 Oct 27 11:43 repY
drwxr-xr-x. 2 root root 24 Oct 27 11:25 repZ

/test/repY:
total 4
-rw-r--r--. 1 root root 20 Oct 27 11:29 Y1
-rw-r--r--. 1 root root  0 Oct 27 11:24 Y2
-rw-r--r--. 1 root root  0 Oct 27 11:24 Y3

/test/repZ:
total 4
-rw-r--r--. 1 root root 21 Oct 27 11:29 Z1
-rw-r--r--. 1 root root  0 Oct 27 11:25 Z2
```

La Commande dd

Présentation

La commande **dd** n'est pas réellement une commande de sauvegarde.

La commande **dd** copie le fichier passé en entrée dans le fichier de sortie en limitant le nombre d'octets copiés par l'utilisation de deux options :

- **count**
  - le nombre
- **bs**
  - la taille du bloc à copier

Options de la Commande

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

```
[root@centos7 /]# dd --help
Usage: dd [OPERAND]...
  or:  dd OPTION
Copy a file, converting and formatting according to the operands.

  bs=BYTES        read and write up to BYTES bytes at a time
  cbs=BYTES       convert BYTES bytes at a time
  conv=CONVS      convert the file as per the comma separated symbol list
  count=N         copy only N input blocks
  ibs=BYTES       read up to BYTES bytes at a time (default: 512)
  if=FILE         read from FILE instead of stdin
  iflag=FLAGS     read as per the comma separated symbol list
  obs=BYTES       write BYTES bytes at a time (default: 512)
  of=FILE         write to FILE instead of stdout
  oflag=FLAGS     write as per the comma separated symbol list
  seek=N          skip N obs-sized blocks at start of output
  skip=N          skip N ibs-sized blocks at start of input
  status=WHICH    WHICH info to suppress outputting to stderr;
                  'noxfer' suppresses transfer stats, 'none' suppresses all
```

```
N and BYTES may be followed by the following multiplicative suffixes:
c =1, w =2, b =512, kB =1000, K =1024, MB =1000*1000, M =1024*1024, xM =M
GB =1000*1000*1000, G =1024*1024*1024, and so on for T, P, E, Z, Y.

Each CONV symbol may be:

  ascii     from EBCDIC to ASCII
  ebcdic    from ASCII to EBCDIC
  ibm       from ASCII to alternate EBCDIC
  block     pad newline-terminated records with spaces to cbs-size
  unblock   replace trailing spaces in cbs-size records with newline
  lcase     change upper case to lower case
  ucase     change lower case to upper case
  sparse    try to seek rather than write the output for NUL input blocks
  swab      swap every pair of input bytes
  sync      pad every input block with NULs to ibs-size; when used
            with block or unblock, pad with spaces rather than NULs
  excl      fail if the output file already exists
  nocreat   do not create the output file
  notrunc   do not truncate the output file
  noerror   continue after read errors
  fdatasync  physically write output file data before finishing
  fsync     likewise, but also write metadata

Each FLAG symbol may be:

  append    append mode (makes sense only for output; conv=notrunc suggested)
  direct    use direct I/O for data
  directory  fail unless a directory
  dsync     use synchronized I/O for data
  sync      likewise, but also for metadata
  fullblock  accumulate full blocks of input (iflag only)
  nonblock  use non-blocking I/O
  noatime   do not update access time
```

```
  nocache   discard cached data
  noctty    do not assign controlling terminal from file
  nofollow  do not follow symlinks
  count_bytes  treat 'count=N' as a byte count (iflag only)
  skip_bytes  treat 'skip=N' as a byte count (iflag only)
  seek_bytes  treat 'seek=N' as a byte count (oflag only)

Sending a USR1 signal to a running 'dd' process makes it
print I/O statistics to standard error and then resume copying.

  $ dd if=/dev/zero of=/dev/null& pid=$!
  $ kill -USR1 $pid; sleep 1; kill $pid
  18335302+0 records in
  18335302+0 records out
  9387674624 bytes (9.4 GB) copied, 34.6279 seconds, 271 MB/s

Options are:

      --help     display this help and exit
      --version  output version information and exit

GNU coreutils online help: <http://www.gnu.org/software/coreutils/>
For complete documentation, run: info coreutils 'dd invocation'
```

LAB #3 - Travailler avec la Commande dd

Vous allez utiliser maintenant le logiciel **dd** pour effectuer une sauvegarde de votre MBR et de la table des partitions.

Effectuez une sauvegarde de votre MBR qui se trouve dans les premiers 446 octets de votre disque **/dev/sda** :

```
[root@centos7 /]# dd if=/dev/sda of=/tmp/mbr.save bs=1 count=446
446+0 records in
446+0 records out
```

```
446 bytes (446 B) copied, 0.0568353 s, 7.8 kB/s
```

Effectuez maintenant une sauvegarde de votre table des partitions qui se trouve dans les 64 octets après les 446 précédemment sauvegardés :

```
[root@centos7 /]# dd if=/dev/sda of=/tmp/tblpart.save bs=1 count=64 skip=446
64+0 records in
64+0 records out
64 bytes (64 B) copied, 0.000831091 s, 77.0 kB/s
```

Important - Notez l'utilisation de l'option **skip** qui permet de positionner le début de la sauvegarde au 447ième octet.

dump et restore

Présentation

Les commandes **dump** et **restore** se basent sur le format d'enregistrement des données (ext3). Pour cette raison il n'est pas possible de sauvegarder des répertoires à l'intérieur d'un système de fichiers mais uniquement des systèmes de fichiers complets.

Il est important de noter que le système de fichier ne doit pas être utilisé pendant le processus de dump. Pour cette raison il est normalement conseillé de démonter le système de fichiers.

Il existe 10 niveaux de dump possibles de à **9**. Lors d'un dump le niveau est spécifié. Chaque fois qu'un dump est effectué, cette information est sauvegardée dans le fichier /etc/dumpdates.

Par définition un dump de niveau est une sauvegarde complète tandis que le dump de niveau 1 est une sauvegarde incrémentale.

Notez que les fichiers sont sauvegardés avec des nom relatifs. Ceci implique que vous devez vous positionner dans le système de fichiers lors de la restauration avec la commande **restore**.

Compression

La Commande gzip

Présentation

La commande **gzip** est un utilitaire de compression sous GNU/Linux. La commande **gunzip** est un utilitaire de décompression sous GNU/Linux.

Options des Commandes

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

```
[root@centos7 /]# gzip --help
Usage: gzip [OPTION]... [FILE]...
Compress or uncompress FILEs (by default, compress FILES in-place).

Mandatory arguments to long options are mandatory for short options too.

  -c, --stdout      write on standard output, keep original files unchanged
  -d, --decompress  decompress
  -f, --force       force overwrite of output file and compress links
  -h, --help        give this help
  -l, --list        list compressed file contents
  -L, --license     display software license
  -n, --no-name     do not save or restore the original name and time stamp
  -N, --name        save or restore the original name and time stamp
  -q, --quiet       suppress all warnings
  -r, --recursive   operate recursively on directories
  -S, --suffix=SUF  use suffix SUF on compressed files
  -t, --test        test compressed file integrity
```

```
  -v, --verbose     verbose mode
  -V, --version     display version number
  -1, --fast        compress faster
  -9, --best        compress better
    --rsyncable   Make rsync-friendly archive

With no FILE, or when FILE is -, read standard input.

Report bugs to <bug-gzip@gnu.org>.
```

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

```
[root@centos7 /]# gunzip --help
Usage: /bin/gunzip [OPTION]... [FILE]...
Uncompress FILEs (by default, in-place).

Mandatory arguments to long options are mandatory for short options too.

  -c, --stdout      write on standard output, keep original files unchanged
  -f, --force       force overwrite of output file and compress links
  -l, --list        list compressed file contents
  -n, --no-name     do not save or restore the original name and time stamp
  -N, --name        save or restore the original name and time stamp
  -q, --quiet       suppress all warnings
  -r, --recursive   operate recursively on directories
  -S, --suffix=SUF  use suffix SUF on compressed files
  -t, --test        test compressed file integrity
  -v, --verbose     verbose mode
      --help        display this help and exit
      --version     display version information and exit

With no FILE, or when FILE is -, read standard input.
```

```
Report bugs to <bug-gzip@gnu.org>.
```

LAB #4 - Travaller avec la Commande gzip

Utilisez **gzip** pour compresser votre fichier tar :

```
[root@centos7 /]# gzip /tmp/test.tar
```

Constatez la taille du fichier **test.tar.gz** :

```
[root@centos7 /]# ls -l /tmp/test.tar.gz
-rw-r--r--. 1 root root 219 Oct 27 11:27 /tmp/test.tar.gz
```

Important - Notez que le fichier compressé a été créé dans le même répertoire que le fichier source et que le fichier source a disparu.

Décompressez le fichier test.tar.gz :

```
[root@centos /]# gunzip /tmp/test.tar.gz
```

La Commande bzip2

Présentation

La commande **bzip2** est un utilitaire de compression sous GNU/Linux. La commande **bunzip2** est un utilitaire de décompression sous GNU/Linux.

Options des Commandes

Les options de la commande **bzip2** sont :

```
[root@centos7 /]# bzip2 --help
bzip2, a block-sorting file compressor.  Version 1.0.6, 6-Sept-2010.

   usage: bzip2 [flags and input files in any order]

   -h --help           print this message
   -d --decompress     force decompression
   -z --compress       force compression
   -k --keep           keep (don't delete) input files
   -f --force          overwrite existing output files
   -t --test           test compressed file integrity
   -c --stdout         output to standard out
   -q --quiet          suppress noncritical error messages
   -v --verbose        be verbose (a 2nd -v gives more)
   -L --license        display software version & license
   -V --version        display software version & license
   -s --small          use less memory (at most 2500k)
   -1 .. -9            set block size to 100k .. 900k
   --fast              alias for -1
   --best              alias for -9

   If invoked as `bzip2', default action is to compress.
              as `bunzip2',  default action is to decompress.
              as `bzcat', default action is to decompress to stdout.

   If no file names are given, bzip2 compresses or decompresses
   from standard input to standard output.  You can combine
   short flags, so `-v -4' means the same as -v4 or -4v, &c.
```

Les options de la commande **bunzip2** sont :

```
[root@centos7 /]# bunzip2 --help
bzip2, a block-sorting file compressor.  Version 1.0.6, 6-Sept-2010.

   usage: bunzip2 [flags and input files in any order]

   -h --help           print this message
   -d --decompress     force decompression
   -z --compress       force compression
   -k --keep           keep (don't delete) input files
   -f --force          overwrite existing output files
   -t --test           test compressed file integrity
   -c --stdout         output to standard out
   -q --quiet          suppress noncritical error messages
   -v --verbose        be verbose (a 2nd -v gives more)
   -L --license        display software version & license
   -V --version        display software version & license
   -s --small          use less memory (at most 2500k)
   -1 .. -9            set block size to 100k .. 900k
   --fast              alias for -1
   --best              alias for -9

   If invoked as `bzip2', default action is to compress.
              as `bunzip2',  default action is to decompress.
              as `bzcat', default action is to decompress to stdout.

   If no file names are given, bzip2 compresses or decompresses
   from standard input to standard output.  You can combine
   short flags, so `-v -4' means the same as -v4 or -4v, &c.
```

LAB #5 - Travailler avec la Commande bzip2

Utilisez **bzip2** pour compresser votre fichier tar :

```
[root@centos7 /]# bzip2 /tmp/test.tar
```

Constatez la taille du fichier **tar.bz2** :

```
[root@centos7 /]# ls -l /tmp | grep test.tar.bz2
-rw-r--r--. 1 root    root      206 Oct 27 11:27 test.tar.bz2
```

Important - Notez que le fichier compressé a été créé dans le même répertoire que le fichier source et que le fichier source a disparu.

Décompressez le fichier tar.bz2 :

```
[root@centos7 /]# bunzip2 /tmp/test.tar.bz2
```

La Commande xz

Présentation

La commande **xz** est un utilitaire de compression sous GNU/Linux. D'autres commandes sont :

- **unxz** - équivalent à **xz –decompress**.
- **xzcat** - équivalent à **xz –decompress –stdout**.
- **lzma** - équivalent à **xz –format=lzma**.
- **unlzma** - équivalent à **xz –format=lzma –decompress**.
- **lzcat** - équivalent à **xz –format=lzma –decompress –stdout**.

La commande xz ne compressera pas le fichier si :

- le fichier n'est pas de type standard
- le fichier est un lien symbolique
- le fichier est un lien physique
- le fichier possède le sticky bit, le SUID bit ou le SGID bit
- le fichier possède déjà une extension .xz ou .lzma

La commande xz ne décompressera pas le fichier si :

- le fichier ne possède pas d'extension .xz ou .lzma

Options des Commandes

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

```
[root@centos7 /]# xz --help
Usage: xz [OPTION]... [FILE]...
Compress or decompress FILEs in the .xz format.

  -z, --compress      force compression
  -d, --decompress, --uncompress
                      force decompression
  -t, --test          test compressed file integrity
  -l, --list          list information about .xz files
  -k, --keep          keep (don't delete) input files
  -f, --force         force overwrite of output file and (de)compress links
  -c, --stdout, --to-stdout
                      write to standard output and don't delete input files
  -0 ... -9           compression preset; default is 6; take compressor *and*
                      decompressor memory usage into account before using 7-9!
  -e, --extreme       try to improve compression ratio by using more CPU time;
                      does not affect decompressor memory requirements
```

```
  -T, --threads=NUM   use at most NUM threads; the default is 1; set to 0
                      to use the number of processor cores
  -q, --quiet         suppress warnings; specify twice to suppress errors too
  -v, --verbose       be verbose; specify twice for even more verbose
  -h, --help          display this short help and exit
  -H, --long-help     display the long help (lists also the advanced options)
  -V, --version       display the version number and exit

With no FILE, or when FILE is -, read standard input.

Report bugs to <lasse.collin@tukaani.org> (in English or Finnish).
XZ Utils home page: <http://tukaani.org/xz/>
```

LAB #6 - Travailler avec la Commande xz

Utilisez **xz** pour compresser votre fichier tar :

```
[root@centos7 /]# xz /tmp/test.tar
```

Important - Notez que le fonctionnement par défaut de la commande est identique à celui de l'option **-z**.

Constatez la présence du fichier **test.tar.xz** :

```
[root@centos7 /]# ls -l /tmp | grep test.tar.xz
-rw-r--r--. 1 root    root      232 Oct 27 11:27 test.tar.xz
```

Important - Notez que le fichier compressé a été créé dans le même répertoire que le fichier source et que le fichier source a disparu. Le fichier source peut être maintenue si l'option **–keep** est spécifiée. Si le fichier test.tar.xz avait déjà existé, la commande aurait échouée avec un message

d'erreur. L'extension du fichier est **.xz**, cependant la commande peut aussi gérer l'extension **.lzma**.

Décompressez le fichier test.tar.xz :

```
[root@centos7 /]# xz -d /tmp/test.tar.xz
[root@centos7 /]# ls -l /tmp | grep test
-rw-rw-r--. 1 trainee trainee     0 Oct 15 13:31 test
-rw-r--r--. 1 root    root      512 Oct 27 11:40 test.cpio
-rw-r--r--. 1 root    root    10240 Oct 27 11:27 test.tar
```

Autres Utilitaires

Il existe d'autres utilitaires pour la compression, chacun produisant un fichier ayant une extension spécifique :

Outil	Extension	Commande de Compression	Commande de Décompression
compress	.Z	compress	uncompress
rar	.rar	rar	unrar
zip	.zip	zip	unzip