Version : **2021.01**

Updated : 2021/11/01 15:52

LCE504 - Managing Disks and Filesystems

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Peripherals

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- vg[x]
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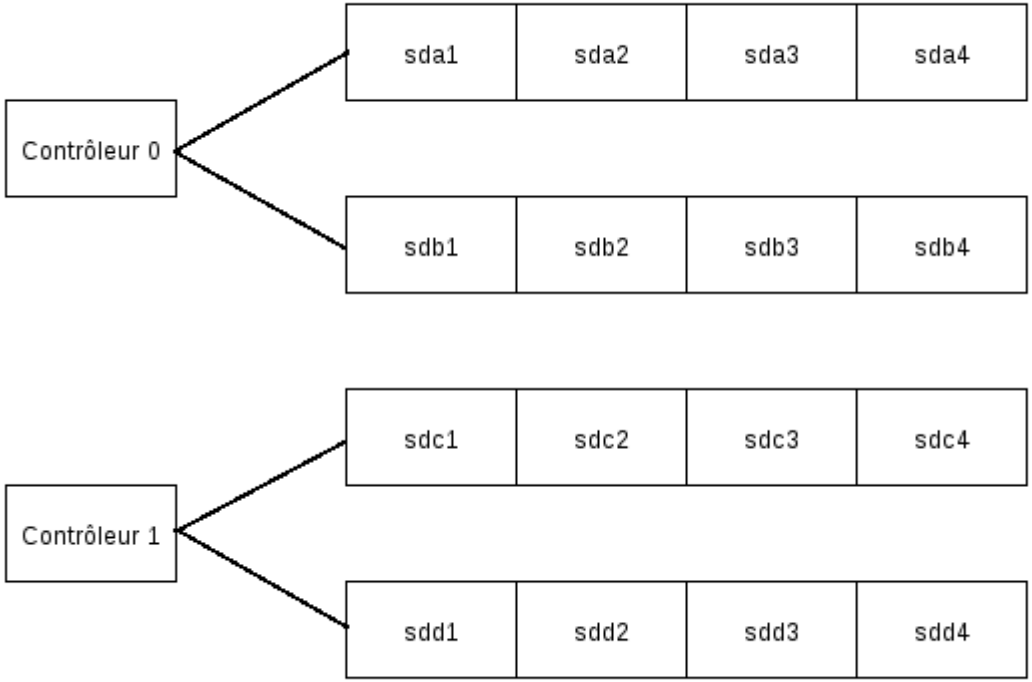
Partitions



The number of partitions is limited :

- **IDE**,
  - Up to **63**,
- **SCSI**,
  - Up to **15**,

- **Disks using the API libata**,
  - Up to **15**.

Partitioning

LAB #1 - Partioning your Disk with the fdisk Command

```
[root@centos8 ~]# fdisk /dev/sdb

Welcome to fdisk (util-linux 2.32.1).
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.
Created a new DOS disklabel with disk identifier 0xb0dacb39.

Command (m for help):
```

```
Command (m for help): m

Help:

  DOS (MBR)
   a   toggle a bootable flag
   b   edit nested BSD disklabel
   c   toggle the dos compatibility flag

  Generic
   d   delete a partition
   F   list free unpartitioned space
   l   list known partition types
   n   add a new partition
```

```
   p   print the partition table
   t   change a partition type
   v   verify the partition table
   i   print information about a partition

  Misc
   m   print this menu
   u   change display/entry units
   x   extra functionality (experts only)

  Script
   I   load disk layout from sfdisk script file
   O   dump disk layout to sfdisk script file

  Save & Exit
   w   write table to disk and exit
   q   quit without saving changes

  Create a new label
   g   create a new empty GPT partition table
   G   create a new empty SGI (IRIX) partition table
   o   create a new empty DOS partition table
   s   create a new empty Sun partition table


Command (m for help):
```

Create the following partitions:

Partition	**Type**	**Size**
/dev/sdb1	Primary	100 MB
/dev/sdb2	Primary	100 MB
/dev/sdb3	Primary	100 MB
/dev/sdb4	Extended	From the first available to the last available sectors

Partition	Type	Size
/dev/sdb5	Logical	500 MB
/dev/sdb6	Logical	200 MB
/dev/sdb7	Logical	300 MB
/dev/sda8	Logical	500 MB
/dev/sdb9	Logical	400 MB
/dev/sdb10	Logical	500 MB
/dev/sdb11	Logical	500 MB
/dev/sdb12	Logical	200 MB

```
Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p):

Using default response p.
Partition number (1-4, default 1):
First sector (2048-8388607, default 2048):
Last sector, +sectors or +size{K,M,G,T,P} (2048-8388607, default 8388607): +100M

Created a new partition 1 of type 'Linux' and of size 100 MiB.

Command (m for help): n
Partition type
   p   primary (1 primary, 0 extended, 3 free)
   e   extended (container for logical partitions)
Select (default p):

Using default response p.
Partition number (2-4, default 2):
First sector (206848-8388607, default 206848):
Last sector, +sectors or +size{K,M,G,T,P} (206848-8388607, default 8388607): +100M
```

```
Created a new partition 2 of type 'Linux' and of size 100 MiB.

Command (m for help): n
Partition type
   p   primary (2 primary, 0 extended, 2 free)
   e   extended (container for logical partitions)
Select (default p):

Using default response p.
Partition number (3,4, default 3):
First sector (411648-8388607, default 411648):
Last sector, +sectors or +size{K,M,G,T,P} (411648-8388607, default 8388607): +100M

Created a new partition 3 of type 'Linux' and of size 100 MiB.

Command (m for help):
```

```
Command (m for help): n
Partition type
   p   primary (3 primary, 0 extended, 1 free)
   e   extended (container for logical partitions)
Select (default e): e

Selected partition 4
First sector (616448-8388607, default 616448):
Last sector, +sectors or +size{K,M,G,T,P} (616448-8388607, default 8388607):

Created a new partition 4 of type 'Extended' and of size 3.7 GiB.

Command (m for help):
```

```
Command (m for help): n
All primary partitions are in use.
Adding logical partition 5
```

```
First sector (618496-8388607, default 618496):
Last sector, +sectors or +size{K,M,G,T,P} (618496-8388607, default 8388607): +500M

Created a new partition 5 of type 'Linux' and of size 500 MiB.

Command (m for help): n
All primary partitions are in use.
Adding logical partition 6
First sector (1644544-8388607, default 1644544):
Last sector, +sectors or +size{K,M,G,T,P} (1644544-8388607, default 8388607): +200M

Created a new partition 6 of type 'Linux' and of size 200 MiB.

Command (m for help): n
All primary partitions are in use.
Adding logical partition 7
First sector (2056192-8388607, default 2056192):
Last sector, +sectors or +size{K,M,G,T,P} (2056192-8388607, default 8388607): +300M

Created a new partition 7 of type 'Linux' and of size 300 MiB.

Command (m for help): n
All primary partitions are in use.
Adding logical partition 8
First sector (2672640-8388607, default 2672640):
Last sector, +sectors or +size{K,M,G,T,P} (2672640-8388607, default 8388607): +500M

Created a new partition 8 of type 'Linux' and of size 500 MiB.

Command (m for help): n
All primary partitions are in use.
Adding logical partition 9
First sector (3698688-8388607, default 3698688):
Last sector, +sectors or +size{K,M,G,T,P} (3698688-8388607, default 8388607): +400M
```

```
Created a new partition 9 of type 'Linux' and of size 400 MiB.

 Command (m for help): n
All primary partitions are in use.
Adding logical partition 10
First sector (4519936-8388607, default 4519936):
Last sector, +sectors or +size{K,M,G,T,P} (4519936-8388607, default 8388607): +500M

Created a new partition 10 of type 'Linux' and of size 500 MiB.

Command (m for help): n
All primary partitions are in use.
Adding logical partition 11
First sector (5545984-8388607, default 5545984):
Last sector, +sectors or +size{K,M,G,T,P} (5545984-8388607, default 8388607): +500M

Created a new partition 11 of type 'Linux' and of size 500 MiB.

Command (m for help): n
All primary partitions are in use.
Adding logical partition 12
First sector (6572032-8388607, default 6572032):
Last sector, +sectors or +size{K,M,G,T,P} (6572032-8388607, default 8388607): +200M

Created a new partition 12 of type 'Linux' and of size 200 MiB.

Command (m for help):
```

```
Command (m for help): p
Disk /dev/sdb: 4 GiB, 4294967296 bytes, 8388608 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
```

```
Disk identifier: 0xb0dacb39

Device     Boot   Start     End Sectors  Size Id Type
/dev/sdb1          2048  206847  204800  100M 83 Linux
/dev/sdb2        206848  411647  204800  100M 83 Linux
/dev/sdb3        411648  616447  204800  100M 83 Linux
/dev/sdb4        616448 8388607 7772160  3.7G  5 Extended
/dev/sdb5        618496 1642495 1024000  500M 83 Linux
/dev/sdb6       1644544 2054143  409600  200M 83 Linux
/dev/sdb7       2056192 2670591  614400  300M 83 Linux
/dev/sdb8       2672640 3696639 1024000  500M 83 Linux
/dev/sdb9       3698688 4517887  819200  400M 83 Linux
/dev/sdb10      4519936 5543935 1024000  500M 83 Linux
/dev/sdb11      5545984 6569983 1024000  500M 83 Linux
/dev/sdb12      6572032 6981631  409600  200M 83 Linux

Command (m for help):
```

```
Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.

[root@centos8 ~]# partprobe
[root@centos8 ~]#
```

```
[root@centos8 ~]# fdisk /dev/sdb

Welcome to fdisk (util-linux 2.32.1).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.


Command (m for help): p
```

```
Disk /dev/sdb: 4 GiB, 4294967296 bytes, 8388608 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xb0dacb39

Device     Boot   Start     End Sectors  Size Id Type
/dev/sdb1          2048  206847  204800  100M 83 Linux
/dev/sdb2        206848  411647  204800  100M 83 Linux
/dev/sdb3        411648  616447  204800  100M 83 Linux
/dev/sdb4        616448 8388607 7772160  3.7G  5 Extended
/dev/sdb5        618496 1642495 1024000  500M 83 Linux
/dev/sdb6       1644544 2054143  409600  200M 83 Linux
/dev/sdb7       2056192 2670591  614400  300M 83 Linux
/dev/sdb8       2672640 3696639 1024000  500M 83 Linux
/dev/sdb9       3698688 4517887  819200  400M 83 Linux
/dev/sdb10      4519936 5543935 1024000  500M 83 Linux
/dev/sdb11      5545984 6569983 1024000  500M 83 Linux
/dev/sdb12      6572032 6981631  409600  200M 83 Linux

Command (m for help):
```

```
Command (m for help): d
Partition number (1-12, default 12): 12

Partition 12 has been deleted.

Command (m for help): p
Disk /dev/sdb: 4 GiB, 4294967296 bytes, 8388608 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
```

```
Disk identifier: 0xb0dacb39

Device     Boot   Start     End Sectors  Size Id Type
/dev/sdb1          2048  206847  204800  100M 83 Linux
/dev/sdb2        206848  411647  204800  100M 83 Linux
/dev/sdb3        411648  616447  204800  100M 83 Linux
/dev/sdb4        616448 8388607 7772160  3.7G  5 Extended
/dev/sdb5        618496 1642495 1024000  500M 83 Linux
/dev/sdb6       1644544 2054143  409600  200M 83 Linux
/dev/sdb7       2056192 2670591  614400  300M 83 Linux
/dev/sdb8       2672640 3696639 1024000  500M 83 Linux
/dev/sdb9       3698688 4517887  819200  400M 83 Linux
/dev/sdb10      4519936 5543935 1024000  500M 83 Linux
/dev/sdb11      5545984 6569983 1024000  500M 83 Linux

Command (m for help):
```

```
Command (m for help): q

[root@centos8 ~]# fdisk /dev/sdb

Welcome to fdisk (util-linux 2.32.1).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.


Command (m for help): p
Disk /dev/sdb: 4 GiB, 4294967296 bytes, 8388608 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xb0dacb39
```

```
Device     Boot   Start     End Sectors  Size Id Type
/dev/sdb1          2048  206847  204800  100M 83 Linux
/dev/sdb2        206848  411647  204800  100M 83 Linux
/dev/sdb3        411648  616447  204800  100M 83 Linux
/dev/sdb4        616448 8388607 7772160  3.7G  5 Extended
/dev/sdb5        618496 1642495 1024000  500M 83 Linux
/dev/sdb6       1644544 2054143  409600  200M 83 Linux
/dev/sdb7       2056192 2670591  614400  300M 83 Linux
/dev/sdb8       2672640 3696639 1024000  500M 83 Linux
/dev/sdb9       3698688 4517887  819200  400M 83 Linux
/dev/sdb10      4519936 5543935 1024000  500M 83 Linux
/dev/sdb11      5545984 6569983 1024000  500M 83 Linux
/dev/sdb12      6572032 6981631  409600  200M 83 Linux

Command (m for help):
```

LAB #2 - Modifier les Drapeaux des Partitions avec fdisk

Size	Type
500 MB	RAID (fd)
200 MB	Linux LVM (8e)
300 MB	Linux LVM (8e)
500 MB	RAID (fd)
400 MB	Linux LVM (8e)
500 MB	RAID (fd)
500 MB	RAID (fd)
200 MB	Do not change

```
Command (m for help): t
Partition number (1-12, default 12): 5
Hex code (type L to list all codes): fd

Changed type of partition 'Linux' to 'Linux raid autodetect'.
```

```
Command (m for help): t
Partition number (1-12, default 12): 6
Hex code (type L to list all codes): 8e

Changed type of partition 'Linux' to 'Linux LVM'.

Command (m for help): t
Partition number (1-12, default 12): 7
Hex code (type L to list all codes): 8e

Changed type of partition 'Linux' to 'Linux LVM'.

Command (m for help): t
Partition number (1-12, default 12): 8
Hex code (type L to list all codes): fd

Changed type of partition 'Linux' to 'Linux raid autodetect'.

Command (m for help): t
Partition number (1-12, default 12): 9
Hex code (type L to list all codes): 8e

Changed type of partition 'Linux' to 'Linux LVM'.

Command (m for help): t
Partition number (1-12, default 12): 10
Hex code (type L to list all codes): fd

Changed type of partition 'Linux' to 'Linux raid autodetect'.

Command (m for help): t
Partition number (1-12, default 12): 11
Hex code (type L to list all codes): fd
```

```
Changed type of partition 'Linux' to 'Linux raid autodetect'.
```

```
Command (m for help): p
Disk /dev/sdb: 4 GiB, 4294967296 bytes, 8388608 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xb0dacb39

Device     Boot   Start     End Sectors  Size Id Type
/dev/sdb1          2048  206847  204800  100M 83 Linux
/dev/sdb2        206848  411647  204800  100M 83 Linux
/dev/sdb3        411648  616447  204800  100M 83 Linux
/dev/sdb4        616448 8388607 7772160  3.7G  5 Extended
/dev/sdb5        618496 1642495 1024000  500M fd Linux raid autodetect
/dev/sdb6       1644544 2054143  409600  200M 8e Linux LVM
/dev/sdb7       2056192 2670591  614400  300M 8e Linux LVM
/dev/sdb8       2672640 3696639 1024000  500M fd Linux raid autodetect
/dev/sdb9       3698688 4517887  819200  400M 8e Linux LVM
/dev/sdb10      4519936 5543935 1024000  500M fd Linux raid autodetect
/dev/sdb11      5545984 6569983 1024000  500M fd Linux raid autodetect
/dev/sdb12      6572032 6981631  409600  200M 83 Linux

Command (m for help):
```

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

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or resource busy.
The kernel still uses the old table. The new table will be used at
the next reboot or after you run partprobe(8) or kpartx(8)
```

```
Syncing disks.
[root@centos8 ~]# partprobe
```

Command Line Switches

The command line switches of this command are:

```
[root@centos8 ~]# fdisk --help

Usage:
 fdisk [options] <disk>      change partition table
 fdisk [options] -l [<disk>] list partition table(s)

Display or manipulate a disk partition table.

Options:
 -b, --sector-size <size>      physical and logical sector size
 -B, --protect-boot            don't erase bootbits when creating a new label
 -c, --compatibility[=<mode>]  mode is 'dos' or 'nondos' (default)
 -L, --color[=<when>]          colorize output (auto, always or never)
                                 colors are enabled by default
 -l, --list                    display partitions and exit
 -o, --output <list>           output columns
 -t, --type <type>             recognize specified partition table type only
 -u, --units[=<unit>]          display units: 'cylinders' or 'sectors' (default)
 -s, --getsz                   display device size in 512-byte sectors [DEPRECATED]
     --bytes                   print SIZE in bytes rather than in human readable format
 -w, --wipe <mode>             wipe signatures (auto, always or never)
 -W, --wipe-partitions <mode>  wipe signatures from new partitions (auto, always or never)

 -C, --cylinders <number>      specify the number of cylinders
 -H, --heads <number>          specify the number of heads
 -S, --sectors <number>        specify the number of sectors per track
```

```
 -h, --help                    display this help
 -V, --version                 display version

Available output columns:
 gpt: Device Start End Sectors Size Type Type-UUID Attrs Name UUID
 dos: Device Start End Sectors Cylinders Size Type Id Attrs Boot End-C/H/S Start-C/H/S
 bsd: Slice Start End Sectors Cylinders Size Type Bsize Cpg Fsize
 sgi: Device Start End Sectors Cylinders Size Type Id Attrs
 sun: Device Start End Sectors Cylinders Size Type Id Flags

For more details see fdisk(8).
```

Logical Volume Manager (LVM)

LAB #3 - Linear Logical Volumes

```
/dev/sdb6       1644544 2054143  409600  200M 8e Linux LVM
/dev/sdb7       2056192 2670591  614400  300M 8e Linux LVM
/dev/sdb9       3698688 4517887  819200  400M 8e Linux LVM
```

```
[root@centos8 ~]# vgscan
  Found volume group "cl_centos8" using metadata type lvm2
```

The command line switches of this command are:

```
[root@centos8 ~]# vgscan --longhelp
  vgscan - Search for all volume groups

  vgscan
    [    --ignorelockingfailure ]
    [    --mknodes ]
```

```
  [    --notifydbus ]
  [    --reportformat basic|json ]
  [ COMMON_OPTIONS ]

Common options for lvm:
  [ -d|--debug ]
  [ -h|--help ]
  [ -q|--quiet ]
  [ -v|--verbose ]
  [ -y|--yes ]
  [ -t|--test ]
  [    --commandprofile String ]
  [    --config String ]
  [    --driverloaded y|n ]
  [    --nolocking ]
  [    --lockopt String ]
  [    --longhelp ]
  [    --profile String ]
  [    --version ]

Common variables for lvm:
      Variables in option or position args are capitalized,
      e.g. PV, VG, LV, Size, Number, String, Tag.

      PV
      Physical Volume name, a device path under /dev.
      For commands managing physical extents, a PV positional arg
      generally accepts a suffix indicating a range (or multiple ranges)
      of PEs. When the first PE is omitted, it defaults to the start of
      the device, and when the last PE is omitted it defaults to the end.
      PV[:PE-PE]... is start and end range (inclusive),
      PV[:PE+PE]... is start and length range (counting from 0).

      LV
```

```
        Logical Volume name. See lvm(8) for valid names. An LV positional
        arg generally includes the VG name and LV name, e.g. VG/LV.
        LV followed by _<type> indicates that an LV of the given type is
        required. (raid represents raid<N> type).
        The _new suffix indicates that the LV name is new.

        Tag
        Tag name. See lvm(8) for information about tag names and using
        tags in place of a VG, LV or PV.

        Select
        Select indicates that a required positional arg can be omitted
        if the --select option is used. No arg appears in this position.

        Size[UNIT]
        Size is an input number that accepts an optional unit.
        Input units are always treated as base two values, regardless of
        capitalization, e.g. 'k' and 'K' both refer to 1024.
        The default input unit is specified by letter, followed by |UNIT.
        UNIT represents other possible input units: BbBsSkKmMgGtTpPeE.
        (This should not be confused with the output control --units, where
        capital letters mean multiple of 1000.)
```

Physical Volume (PV)

```
[root@centos8 ~]# pvcreate /dev/sdb6 /dev/sdb7 /dev/sdb9
  Physical volume "/dev/sdb6" successfully created.
  Physical volume "/dev/sdb7" successfully created.
  Physical volume "/dev/sdb9" successfully created.
```

The command line switches of this command are:

```
[root@centos8 ~]# pvcreate --longhelp
```

```
pvcreate - Initialize physical volume(s) for use by LVM

pvcreate PV ...
  [ -f|--force ]
  [ -M|--metadatatype lvm2 ]
  [ -u|--uuid String ]
  [ -Z|--zero y|n ]
  [    --dataalignment Size[k|UNIT] ]
  [    --dataalignmentoffset Size[k|UNIT] ]
  [    --bootloaderareasize Size[m|UNIT] ]
  [    --labelsector Number ]
  [    --pvmetadatacopies 0|1|2 ]
  [    --metadatasize Size[m|UNIT] ]
  [    --metadataignore y|n ]
  [    --norestorefile ]
  [    --setphysicalvolumesize Size[m|UNIT] ]
  [    --reportformat basic|json ]
  [    --restorefile String ]
  [ COMMON_OPTIONS ]

Common options for lvm:
  [ -d|--debug ]
  [ -h|--help ]
  [ -q|--quiet ]
  [ -v|--verbose ]
  [ -y|--yes ]
  [ -t|--test ]
  [    --commandprofile String ]
  [    --config String ]
  [    --driverloaded y|n ]
  [    --nolocking ]
  [    --lockopt String ]
  [    --longhelp ]
  [    --profile String ]
```

```
    [    --version ]

  Common variables for lvm:
        Variables in option or position args are capitalized,
        e.g. PV, VG, LV, Size, Number, String, Tag.

        PV
        Physical Volume name, a device path under /dev.
        For commands managing physical extents, a PV positional arg
        generally accepts a suffix indicating a range (or multiple ranges)
        of PEs. When the first PE is omitted, it defaults to the start of
        the device, and when the last PE is omitted it defaults to the end.
        PV[:PE-PE]... is start and end range (inclusive),
        PV[:PE+PE]... is start and length range (counting from 0).

        LV
        Logical Volume name. See lvm(8) for valid names. An LV positional
        arg generally includes the VG name and LV name, e.g. VG/LV.
        LV followed by _<type> indicates that an LV of the given type is
        required. (raid represents raid<N> type).
        The _new suffix indicates that the LV name is new.

        Tag
        Tag name. See lvm(8) for information about tag names and using
        tags in place of a VG, LV or PV.

        Select
        Select indicates that a required positional arg can be omitted
        if the --select option is used. No arg appears in this position.

        Size[UNIT]
        Size is an input number that accepts an optional unit.
        Input units are always treated as base two values, regardless of
        capitalization, e.g. 'k' and 'K' both refer to 1024.
```

```
       The default input unit is specified by letter, followed by |UNIT.
       UNIT represents other possible input units: BbBsSkKmMgGtTpPeE.
       (This should not be confused with the output control --units, where
       capital letters mean multiple of 1000.)
```

```
[root@centos8 ~]# pvdisplay /dev/sdb6 /dev/sdb7 /dev/sdb9
  "/dev/sdb6" is a new physical volume of "200.00 MiB"
  --- NEW Physical volume ---
  PV Name               /dev/sdb6
  VG Name
  PV Size               200.00 MiB
  Allocatable           NO
  PE Size               0
  Total PE              0
  Free PE               0
  Allocated PE          0
  PV UUID               xsAjLA-sUEU-dexm-H7G1-Dsi4-q6qW-8Tqkay
  "/dev/sdb7" is a new physical volume of "300.00 MiB"
  --- NEW Physical volume ---
  PV Name               /dev/sdb7
  VG Name
  PV Size               300.00 MiB
  Allocatable           NO
  PE Size               0
  Total PE              0
  Free PE               0
  Allocated PE          0
  PV UUID               WpssK3-sThn-3nS0-80O3-NcW3-23e0-gxejn4
  "/dev/sdb9" is a new physical volume of "400.00 MiB"
  --- NEW Physical volume ---
  PV Name               /dev/sdb9
  VG Name
  PV Size               400.00 MiB
  Allocatable           NO
```

```
  PE Size               0
  Total PE              0
  Free PE               0
  Allocated PE          0
  PV UUID               rqaB99-3UdD-pJxE-Z1Eo-h9yv-tZ41-r4UJSY
```

The command line switches of this command are:

```
[root@centos8 ~]# pvdisplay --longhelp
  pvdisplay - Display various attributes of physical volume(s)

  pvdisplay
    [ -a|--all ]
    [ -c|--colon ]
    [ -C|--columns ]
    [ -m|--maps ]
    [ -o|--options String ]
    [ -S|--select String ]
    [ -s|--short ]
    [ -O|--sort String ]
    [    --aligned ]
    [    --binary ]
    [    --configreport log|vg|lv|pv|pvseg|seg ]
    [    --foreign ]
    [    --ignorelockingfailure ]
    [    --logonly ]
    [    --noheadings ]
    [    --nosuffix ]
    [    --readonly ]
    [    --reportformat basic|json ]
    [    --separator String ]
    [    --shared ]
    [    --unbuffered ]
    [    --units r|R|h|H|b|B|s|S|k|K|m|M|g|G|t|T|p|P|e|E ]
```

```
  [ COMMON_OPTIONS ]
  [ PV|Tag ... ]

Common options for lvm:
  [ -d|--debug ]
  [ -h|--help ]
  [ -q|--quiet ]
  [ -v|--verbose ]
  [ -y|--yes ]
  [ -t|--test ]
  [    --commandprofile String ]
  [    --config String ]
  [    --driverloaded y|n ]
  [    --nolocking ]
  [    --lockopt String ]
  [    --longhelp ]
  [    --profile String ]
  [    --version ]

Common variables for lvm:
      Variables in option or position args are capitalized,
      e.g. PV, VG, LV, Size, Number, String, Tag.

      PV
      Physical Volume name, a device path under /dev.
      For commands managing physical extents, a PV positional arg
      generally accepts a suffix indicating a range (or multiple ranges)
      of PEs. When the first PE is omitted, it defaults to the start of
      the device, and when the last PE is omitted it defaults to the end.
      PV[:PE-PE]... is start and end range (inclusive),
      PV[:PE+PE]... is start and length range (counting from 0).

      LV
      Logical Volume name. See lvm(8) for valid names. An LV positional
```

```
        arg generally includes the VG name and LV name, e.g. VG/LV.
        LV followed by _<type> indicates that an LV of the given type is
        required. (raid represents raid<N> type).
        The _new suffix indicates that the LV name is new.

        Tag
        Tag name. See lvm(8) for information about tag names and using
        tags in place of a VG, LV or PV.

        Select
        Select indicates that a required positional arg can be omitted
        if the --select option is used. No arg appears in this position.

        Size[UNIT]
        Size is an input number that accepts an optional unit.
        Input units are always treated as base two values, regardless of
        capitalization, e.g. 'k' and 'K' both refer to 1024.
        The default input unit is specified by letter, followed by |UNIT.
        UNIT represents other possible input units: BbBsSkKmMgGtTpPeE.
        (This should not be confused with the output control --units, where
        capital letters mean multiple of 1000.)
```

Volume Groups (VG) and Physical Extents (PE)

```
[root@centos8 ~]# vgcreate -s 8M vg0 /dev/sdb6 /dev/sdb7 /dev/sdb9
  Volume group "vg0" successfully created
```

The command line switches of this command are:

```
[root@centos8 ~]# vgcreate --help
  vgcreate - Create a volume group

  vgcreate VG_new PV ...
```

```
    [ -A|--autobackup y|n ]
    [ -c|--clustered y|n ]
    [ -l|--maxlogicalvolumes Number ]
    [ -p|--maxphysicalvolumes Number ]
    [ -M|--metadatatype lvm2 ]
    [ -s|--physicalextentsize Size[m|UNIT] ]
    [ -f|--force ]
    [ -Z|--zero y|n ]
    [    --addtag Tag ]
    [    --alloc contiguous|cling|cling_by_tags|normal|anywhere|inherit ]
    [    --metadataprofile String ]
    [    --labelsector Number ]
    [    --metadatasize Size[m|UNIT] ]
    [    --pvmetadatacopies 0|1|2 ]
    [    --vgmetadatacopies all|unmanaged|Number ]
    [    --reportformat basic|json ]
    [    --dataalignment Size[k|UNIT] ]
    [    --dataalignmentoffset Size[k|UNIT] ]
    [    --shared ]
    [    --systemid String ]
    [    --locktype sanlock|dlm|none ]
    [ COMMON_OPTIONS ]

  Common options for lvm:
    [ -d|--debug ]
    [ -h|--help ]
    [ -q|--quiet ]
    [ -v|--verbose ]
    [ -y|--yes ]
    [ -t|--test ]
    [    --commandprofile String ]
    [    --config String ]
    [    --driverloaded y|n ]
    [    --nolocking ]
```

```
    [    --lockopt String ]
    [    --longhelp ]
    [    --profile String ]
    [    --version ]

  Use --longhelp to show all options and advanced commands.
```

```
[root@centos8 ~]# vgdisplay vg0
  --- Volume group ---
  VG Name               vg0
  System ID
  Format                lvm2
  Metadata Areas        3
  Metadata Sequence No  1
  VG Access             read/write
  VG Status             resizable
  MAX LV                0
  Cur LV                0
  Open LV               0
  Max PV                0
  Cur PV                3
  Act PV                3
  VG Size               880.00 MiB
  PE Size               8.00 MiB
  Total PE              110
  Alloc PE / Size       0 / 0
  Free  PE / Size       110 / 880.00 MiB
  VG UUID               6cO8IX-xhvn-5J4z-Em2t-7RAq-u3y8-1cVZln
```

The command line switches of this command are:

```
[root@centos8 ~]# vgdisplay --help
  vgdisplay - Display volume group information
```

```
vgdisplay
  [ -A|--activevolumegroups ]
  [ -c|--colon ]
  [ -C|--columns ]
  [ -o|--options String ]
  [ -S|--select String ]
  [ -s|--short ]
  [ -O|--sort String ]
  [    --aligned ]
  [    --binary ]
  [    --configreport log|vg|lv|pv|pvseg|seg ]
  [    --foreign ]
  [    --ignorelockingfailure ]
  [    --logonly ]
  [    --noheadings ]
  [    --nosuffix ]
  [    --readonly ]
  [    --reportformat basic|json ]
  [    --shared ]
  [    --separator String ]
  [    --unbuffered ]
  [    --units r|R|h|H|b|B|s|S|k|K|m|M|g|G|t|T|p|P|e|E ]
  [ COMMON_OPTIONS ]
  [ VG|Tag ... ]

Common options for lvm:
  [ -d|--debug ]
  [ -h|--help ]
  [ -q|--quiet ]
  [ -v|--verbose ]
  [ -y|--yes ]
  [ -t|--test ]
  [    --commandprofile String ]
  [    --config String ]
```

```
    [    --driverloaded y|n ]
    [    --nolocking ]
    [    --lockopt String ]
    [    --longhelp ]
    [    --profile String ]
    [    --version ]

  Use --longhelp to show all options and advanced commands.
```

Logical Volumes (LV)

```
[root@centos8 ~]# lvcreate -L 350 -n lv0 vg0
  Rounding up size to full physical extent 352.00 MiB
  Logical volume "lv0" created.
```

Important - Note that the LV size is a multiple of the PE size.

The command line switches of this command are:

```
[root@centos8 ~]# lvcreate --help
  lvcreate - Create a logical volume

  Create a linear LV.
  lvcreate -L|--size Size[m|UNIT] VG
    [ -l|--extents Number[PERCENT] ]
    [    --type linear ]
    [ COMMON_OPTIONS ]
    [ PV ... ]

  Create a striped LV (infers --type striped).
```

```
lvcreate -i|--stripes Number -L|--size Size[m|UNIT] VG
  [ -l|--extents Number[PERCENT] ]
  [ -I|--stripesize Size[k|UNIT] ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a raid1 or mirror LV (infers --type raid1|mirror).
lvcreate -m|--mirrors Number -L|--size Size[m|UNIT] VG
  [ -l|--extents Number[PERCENT] ]
  [ -R|--regionsize Size[m|UNIT] ]
  [    --mirrorlog core|disk ]
  [    --minrecoveryrate Size[k|UNIT] ]
  [    --maxrecoveryrate Size[k|UNIT] ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a raid LV (a specific raid level must be used, e.g. raid1).
lvcreate --type raid -L|--size Size[m|UNIT] VG
  [ -l|--extents Number[PERCENT] ]
  [ -m|--mirrors Number ]
  [ -i|--stripes Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [ -R|--regionsize Size[m|UNIT] ]
  [    --minrecoveryrate Size[k|UNIT] ]
  [    --maxrecoveryrate Size[k|UNIT] ]
  [    --raidintegrity y|n ]
  [    --raidintegritymode String ]
  [    --raidintegrityblocksize Number ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a raid10 LV.
lvcreate -m|--mirrors Number -i|--stripes Number -L|--size Size[m|UNIT] VG
  [ -l|--extents Number[PERCENT] ]
```

```
  [ -I|--stripesize Size[k|UNIT] ]
  [ -R|--regionsize Size[m|UNIT] ]
  [    --minrecoveryrate Size[k|UNIT] ]
  [    --maxrecoveryrate Size[k|UNIT] ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a COW snapshot LV of an origin LV.
lvcreate -s|--snapshot -L|--size Size[m|UNIT] LV
  [ -l|--extents Number[PERCENT] ]
  [ -i|--stripes Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [ -c|--chunksize Size[k|UNIT] ]
  [    --type snapshot ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a thin pool.
lvcreate --type thin-pool -L|--size Size[m|UNIT] VG
  [ -l|--extents Number[PERCENT] ]
  [ -c|--chunksize Size[k|UNIT] ]
  [ -i|--stripes Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [    --thinpool LV_new ]
  [    --poolmetadatasize Size[m|UNIT] ]
  [    --poolmetadataspare y|n ]
  [    --discards passdown|nopassdown|ignore ]
  [    --errorwhenfull y|n ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a cache pool.
lvcreate --type cache-pool -L|--size Size[m|UNIT] VG
  [ -l|--extents Number[PERCENT] ]
```

```
  [ -H|--cache ]
  [ -c|--chunksize Size[k|UNIT] ]
  [    --poolmetadatasize Size[m|UNIT] ]
  [    --poolmetadataspare y|n ]
  [    --cachemode writethrough|writeback|passthrough ]
  [    --cachepolicy String ]
  [    --cachesettings String ]
  [    --cachemetadataformat auto|1|2 ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a thin LV in a thin pool (infers --type thin).
lvcreate -V|--virtualsize Size[m|UNIT] --thinpool LV_thinpool VG
  [ -T|--thin ]
  [    --type thin ]
  [    --discards passdown|nopassdown|ignore ]
  [    --errorwhenfull y|n ]
  [ COMMON_OPTIONS ]

Create a thin LV that is a snapshot of an existing thin LV
(infers --type thin).
lvcreate -s|--snapshot LV_thin
  [    --type thin ]
  [    --discards passdown|nopassdown|ignore ]
  [    --errorwhenfull y|n ]
  [ COMMON_OPTIONS ]

Create a thin LV that is a snapshot of an external origin LV.
lvcreate --type thin --thinpool LV_thinpool LV
  [ -T|--thin ]
  [ -c|--chunksize Size[k|UNIT] ]
  [    --poolmetadatasize Size[m|UNIT] ]
  [    --poolmetadataspare y|n ]
  [    --discards passdown|nopassdown|ignore ]
```

```
  [    --errorwhenfull y|n ]
  [ COMMON_OPTIONS ]

Create a LV that returns VDO when used.
lvcreate --type vdo -L|--size Size[m|UNIT] VG
  [ -l|--extents Number[PERCENT] ]
  [ -V|--virtualsize Size[m|UNIT] ]
  [ -i|--stripes Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [    --vdo ]
  [    --vdopool LV_new ]
  [    --compression y|n ]
  [    --deduplication y|n ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a thin LV, first creating a thin pool for it,
where the new thin pool is named by the --thinpool arg.
lvcreate --type thin -V|--virtualsize Size[m|UNIT] -L|--size Size[m|UNIT] --thinpool LV_new
  [ -l|--extents Number[PERCENT] ]
  [ -T|--thin ]
  [ -c|--chunksize Size[k|UNIT] ]
  [ -i|--stripes Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [    --poolmetadatasize Size[m|UNIT] ]
  [    --poolmetadataspare y|n ]
  [    --discards passdown|nopassdown|ignore ]
  [    --errorwhenfull y|n ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a new LV, then attach the specified cachepool
which converts the new LV to type cache.
lvcreate --type cache -L|--size Size[m|UNIT] --cachepool LV_cachepool VG
```

```
  [ -l|--extents Number[PERCENT] ]
  [ -H|--cache ]
  [ -c|--chunksize Size[k|UNIT] ]
  [ -i|--stripes Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [    --poolmetadatasize Size[m|UNIT] ]
  [    --poolmetadataspare y|n ]
  [    --cachemode writethrough|writeback|passthrough ]
  [    --cachepolicy String ]
  [    --cachesettings String ]
  [    --cachemetadataformat auto|1|2 ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a new LV, then attach the specified cachevol
which converts the new LV to type cache.
lvcreate --type cache -L|--size Size[m|UNIT] --cachevol LV VG
  [ -l|--extents Number[PERCENT] ]
  [ -c|--chunksize Size[k|UNIT] ]
  [ -i|--stripes Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [    --cachemode writethrough|writeback|passthrough ]
  [    --cachepolicy String ]
  [    --cachesettings String ]
  [    --cachemetadataformat auto|1|2 ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a new LV, then attach a cachevol created from
the specified cache device, which converts the
new LV to type cache.
lvcreate --type cache -L|--size Size[m|UNIT] --cachedevice PV VG
  [ -l|--extents Number[PERCENT] ]
  [ -c|--chunksize Size[k|UNIT] ]
```

```
  [ -i|--stripes Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [    --cachemode writethrough|writeback|passthrough ]
  [    --cachepolicy String ]
  [    --cachesettings String ]
  [    --cachemetadataformat auto|1|2 ]
  [    --cachesize Size[m|UNIT] ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a new LV, then attach the specified cachevol
which converts the new LV to type writecache.
lvcreate --type writecache -L|--size Size[m|UNIT] --cachevol LV VG
  [ -l|--extents Number[PERCENT] ]
  [ -i|--stripes Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [    --cachesettings String ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Create a new LV, then attach a cachevol created from
the specified cache device, which converts the
new LV to type writecache.
lvcreate --type writecache -L|--size Size[m|UNIT] --cachedevice PV VG
  [ -l|--extents Number[PERCENT] ]
  [ -i|--stripes Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [    --cachesize Size[m|UNIT] ]
  [    --cachesettings String ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Common options for command:
  [ -a|--activate y|n|ay ]
```

```
    [ -A|--autobackup y|n ]
    [ -C|--contiguous y|n ]
    [ -M|--persistent y|n ]
    [ -j|--major Number ]
    [ -k|--setactivationskip y|n ]
    [ -K|--ignoreactivationskip ]
    [ -n|--name String ]
    [ -p|--permission rw|r ]
    [ -r|--readahead auto|none|Number ]
    [ -W|--wipesignatures y|n ]
    [ -Z|--zero y|n ]
    [    --addtag Tag ]
    [    --alloc contiguous|cling|cling_by_tags|normal|anywhere|inherit ]
    [    --ignoremonitoring ]
    [    --metadataprofile String ]
    [    --minor Number ]
    [    --monitor y|n ]
    [    --nosync ]
    [    --noudevsync ]
    [    --reportformat basic|json ]

  Common options for lvm:
    [ -d|--debug ]
    [ -h|--help ]
    [ -q|--quiet ]
    [ -v|--verbose ]
    [ -y|--yes ]
    [ -t|--test ]
    [    --commandprofile String ]
    [    --config String ]
    [    --driverloaded y|n ]
    [    --nolocking ]
    [    --lockopt String ]
    [    --longhelp ]
```

```
    [    --profile String ]
    [    --version ]

  Use --longhelp to show all options and advanced commands.
```

```
[root@centos8 ~]# mkdir /mnt/lvm
```

```
[root@centos8 ~]# mke2fs -j /dev/vg0/lv0
mke2fs 1.45.6 (20-Mar-2020)
Creating filesystem with 360448 1k blocks and 90112 inodes
Filesystem UUID: 87b6d526-d379-4e0c-8984-94811f1cee33
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729, 204801, 221185

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

```
[root@centos8 ~]# mount -t ext3 /dev/vg0/lv0 /mnt/lvm
```

```
[root@centos8 ~]# cp -a /home /mnt/lvm
```

```
[root@centos8 ~]# ls -l /mnt/lvm
total 14
drwxr-xr-x. 5 root root  1024 Apr 20 14:35 home
drwx------. 2 root root 12288 May 26 17:00 lost+found
```

```
[root@centos8 ~]# df -h /mnt/lvm
Filesystem           Size  Used Avail Use% Mounted on
/dev/mapper/vg0-lv0  333M  17M  314M   1% /mnt/lvm
```

LAB #4 - Growing a Volume

```
[root@centos8 ~]# lvextend -L +100M /dev/vg0/lv0
  Rounding size to boundary between physical extents: 104.00 MiB.
  Size of logical volume vg0/lv0 changed from 352.00 MiB (44 extents) to 456.00 MiB (57 extents).
  Logical volume vg0/lv0 successfully resized.
```

The command line switches of this command are:

```
[root@centos8 ~]# lvextend --help
  lvextend - Add space to a logical volume

  Extend an LV by a specified size.
  lvextend -L|--size [+]Size[m|UNIT] LV
    [ -l|--extents [+]Number[PERCENT] ]
    [ -r|--resizefs ]
    [ -i|--stripes Number ]
    [ -I|--stripesize Size[k|UNIT] ]
    [    --poolmetadatasize [+]Size[m|UNIT] ]
    [ COMMON_OPTIONS ]
    [ PV ... ]

  Extend an LV by specified PV extents.
  lvextend LV PV ...
    [ -r|--resizefs ]
    [ -i|--stripes Number ]
    [ -I|--stripesize Size[k|UNIT] ]
    [ COMMON_OPTIONS ]

  Extend a pool metadata SubLV by a specified size.
  lvextend --poolmetadatasize [+]Size[m|UNIT] LV_thinpool
    [ -i|--stripes Number ]
    [ -I|--stripesize Size[k|UNIT] ]
```

```
  [ COMMON_OPTIONS ]
  [ PV ... ]

Extend an LV according to a predefined policy.
lvextend --usepolicies LV_snapshot_thinpool
  [ -r|--resizefs ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Common options for command:
  [ -A|--autobackup y|n ]
  [ -f|--force ]
  [ -m|--mirrors Number ]
  [ -n|--nofsck ]
  [    --alloc contiguous|cling|cling_by_tags|normal|anywhere|inherit ]
  [    --nosync ]
  [    --noudevsync ]
  [    --reportformat basic|json ]
  [    --type linear|striped|snapshot|mirror|raid|thin|cache|vdo|thin-pool|cache-pool|vdo-pool ]

Common options for lvm:
  [ -d|--debug ]
  [ -h|--help ]
  [ -q|--quiet ]
  [ -v|--verbose ]
  [ -y|--yes ]
  [ -t|--test ]
  [    --commandprofile String ]
  [    --config String ]
  [    --driverloaded y|n ]
  [    --nolocking ]
  [    --lockopt String ]
  [    --longhelp ]
  [    --profile String ]
```

```
    [    --version ]

  Use --longhelp to show all options and advanced commands.
```

```
[root@centos8 ~]# resize2fs /dev/vg0/lv0
resize2fs 1.45.6 (20-Mar-2020)
Filesystem at /dev/vg0/lv0 is mounted on /mnt/lvm; on-line resizing required
old_desc_blocks = 2, new_desc_blocks = 2
The filesystem on /dev/vg0/lv0 is now 466944 (1k) blocks long.
```

```
[root@centos8 ~]# df -h /mnt/lvm
Filesystem           Size  Used Avail Use% Mounted on
/dev/mapper/vg0-lv0  434M   17M  395M   5% /mnt/lvm
```

LAB #5 - Snapshots

```
[root@centos8 ~]# dd if=/dev/zero of=/mnt/lvm/10M bs=1048576 count=10
10+0 records in
10+0 records out
10485760 bytes (10 MB, 10 MiB) copied, 0.0281282 s, 373 MB/s
```

```
[root@centos8 ~]# lvcreate -s -L 18M -n testsnap /dev/vg0/lv0
  Rounding up size to full physical extent 24.00 MiB
  Logical volume "testsnap" created.
```

```
[root@centos8 ~]# lvs
  LV       VG         Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  root     cl_centos8 -wi-ao----  27.79g
  swap     cl_centos8 -wi-ao----   3.20g
  lv0      vg0        owi-aos--- 456.00m
  testsnap vg0        swi-a-s---  24.00m      lv0    0.05
```

Important - Note that the snapshot is created in the same VG as the original LV.

The command line switches of this command are:

```
[root@centos8 ~]# lvs --help
  lvs - Display information about logical volumes

  lvs
    [ -H|--history ]
    [ -a|--all ]
    [ -o|--options String ]
    [ -S|--select String ]
    [ -O|--sort String ]
    [    --segments ]
    [    --aligned ]
    [    --binary ]
    [    --configreport log|vg|lv|pv|pvseg|seg ]
    [    --foreign ]
    [    --ignorelockingfailure ]
    [    --logonly ]
    [    --nameprefixes ]
    [    --noheadings ]
    [    --nosuffix ]
    [    --readonly ]
    [    --reportformat basic|json ]
    [    --rows ]
    [    --separator String ]
    [    --shared ]
    [    --unbuffered ]
    [    --units r|R|h|H|b|B|s|S|k|K|m|M|g|G|t|T|p|P|e|E ]
    [    --unquoted ]
```

```
    [ COMMON_OPTIONS ]
    [ VG|LV|Tag ... ]

  Common options for lvm:
    [ -d|--debug ]
    [ -h|--help ]
    [ -q|--quiet ]
    [ -v|--verbose ]
    [ -y|--yes ]
    [ -t|--test ]
    [    --commandprofile String ]
    [    --config String ]
    [    --driverloaded y|n ]
    [    --nolocking ]
    [    --lockopt String ]
    [    --longhelp ]
    [    --profile String ]
    [    --version ]

  Use --longhelp to show all options and advanced commands.
```

```
[root@centos8 ~]# mkdir /mnt/testsnap
```

```
[root@centos8 ~]# mount /dev/vg0/testsnap /mnt/testsnap
```

```
[root@centos8 ~]# ls -l /mnt/lvm
total 10296
-rw-r--r--. 1 root root 10485760 Jun 24 04:41 10M
drwxr-xr-x. 3 root root     1024 Jun 16 06:39 home
drwx------. 2 root root    12288 Jun 24 04:20 lost+found
[root@centos8 ~]# ls -l /mnt/testsnap/
total 10296
-rw-r--r--. 1 root root 10485760 Jun 24 04:41 10M
drwxr-xr-x. 3 root root     1024 Jun 16 06:39 home
```

```
drwx------. 2 root root    12288 Jun 24 04:20 lost+found
```

```
[root@centos8 ~]# rm /mnt/lvm/10M
rm: remove regular file '/mnt/lvm/10M'? y
```

```
[root@centos8 ~]# df -Ph /mnt/lvm
Filesystem           Size  Used Avail Use% Mounted on
/dev/mapper/vg0-lv0  434M   17M  395M   5% /mnt/lvm

[root@centos8 ~]# df -Ph /mnt/testsnap/
Filesystem               Size  Used Avail Use% Mounted on
/dev/mapper/vg0-testsnap  434M   27M  385M   7% /mnt/testsnap

[root@centos8 ~]# lvs
  LV       VG         Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  root     cl_centos8 -wi-ao----  27.79g
  swap     cl_centos8 -wi-ao----   3.20g
  lv0      vg0        owi-aos--- 456.00m
  testsnap vg0        swi-aos---  24.00m      lv0    0.24
```

To do - Restore the 10M file.

LAB #6 - Deleting Volumes

```
[root@centos8 ~]# umount /mnt/testsnap/
[root@centos8 ~]# lvremove /dev/vg0/testsnap
Do you really want to remove active logical volume vg0/testsnap? [y/n]: y
  Logical volume "testsnap" successfully removed
[root@centos8 ~]# umount /mnt/lvm
[root@centos8 ~]# lvremove /dev/vg0/lv0
```

```
Do you really want to remove active logical volume vg0/lv0? [y/n]: y
  Logical volume "lv0" successfully removed
```

The command line switches of this command are:

```
[root@centos8 ~]# lvremove --help
  lvremove - Remove logical volume(s) from the system

  lvremove VG|LV|Tag|Select ...
    [ -A|--autobackup y|n ]
    [ -f|--force ]
    [ -S|--select String ]
    [    --nohistory ]
    [    --noudevsync ]
    [    --reportformat basic|json ]
    [ COMMON_OPTIONS ]

  Common options for lvm:
    [ -d|--debug ]
    [ -h|--help ]
    [ -q|--quiet ]
    [ -v|--verbose ]
    [ -y|--yes ]
    [ -t|--test ]
    [    --commandprofile String ]
    [    --config String ]
    [    --driverloaded y|n ]
    [    --nolocking ]
    [    --lockopt String ]
    [    --longhelp ]
    [    --profile String ]
    [    --version ]
```

```
  Use --longhelp to show all options and advanced commands
```

```
[root@centos8 ~]# vgremove vg0
  Volume group "vg0" successfully removed
```

The command line switches of this command are:

```
[root@centos8 ~]# vgremove --help
  vgremove - Remove volume group(s)

  vgremove VG|Tag|Select ...
    [ -f|--force ]
    [ -S|--select String ]
    [    --noudevsync ]
    [    --reportformat basic|json ]
    [ COMMON_OPTIONS ]

  Common options for lvm:
    [ -d|--debug ]
    [ -h|--help ]
    [ -q|--quiet ]
    [ -v|--verbose ]
    [ -y|--yes ]
    [ -t|--test ]
    [    --commandprofile String ]
    [    --config String ]
    [    --driverloaded y|n ]
    [    --nolocking ]
    [    --lockopt String ]
    [    --longhelp ]
    [    --profile String ]
    [    --version ]
```

```
  Use --longhelp to show all options and advanced commands.
```

```
[root@centos8 ~]# pvremove /dev/sdb6 /dev/sdb7 /dev/sdb9
  Labels on physical volume "/dev/sdb6" successfully wiped.
  Labels on physical volume "/dev/sdb7" successfully wiped.
  Labels on physical volume "/dev/sdb9" successfully wiped.
```

The command line switches of this command are:

```
[root@centos8 ~]# pvremove --help
  pvremove - Remove LVM label(s) from physical volume(s)

  pvremove PV ...
    [ -f|--force ]
    [    --reportformat basic|json ]
    [ COMMON_OPTIONS ]

  Common options for lvm:
    [ -d|--debug ]
    [ -h|--help ]
    [ -q|--quiet ]
    [ -v|--verbose ]
    [ -y|--yes ]
    [ -t|--test ]
    [    --commandprofile String ]
    [    --config String ]
    [    --driverloaded y|n ]
    [    --nolocking ]
    [    --lockopt String ]
    [    --longhelp ]
    [    --profile String ]
    [    --version ]
```

```
  Use --longhelp to show all options and advanced commands.
```

LAB #7 - Mirrored Volumes

```
[root@centos8 ~]# pvcreate /dev/sdb6 /dev/sdb7 /dev/sdb9
  Physical volume "/dev/sdb6" successfully created.
  Physical volume "/dev/sdb7" successfully created.
  Physical volume "/dev/sdb9" successfully created.

[root@centos8 ~]# vgcreate -s 8M vg0 /dev/sdb6 /dev/sdb7 /dev/sdb9
  Volume group "vg0" successfully created
```

```
[root@centos8 ~]# lvcreate -m 1 -L 100M -n lv1 vg0
  Rounding up size to full physical extent 104.00 MiB
  Logical volume "lv1" created.
```

```
[root@centos8 ~]# lvdisplay -m /dev/vg0/lv1
  --- Logical volume ---
  LV Path                /dev/vg0/lv1
  LV Name                lv1
  VG Name                vg0
  LV UUID                lJQQWs-n05T-pxzi-Zq2R-UzRI-kYZf-hsNPYQ
  LV Write Access        read/write
  LV Creation host, time centos8.ittraining.loc, 2021-06-02 07:37:28 -0400
  LV Status              available
  # open                 0
  LV Size                104.00 MiB
  Current LE             13
  Mirrored volumes       2
  Segments               1
  Allocation             inherit
  Read ahead sectors     auto
  - currently set to     8192
```

```
  Block device           253:4
  --- Segments ---
  Logical extents 0 to 12:
    Type        raid1
    Monitoring      monitored
    Raid Data LV 0
      Logical volume    lv1_rimage_0
      Logical extents   0 to 12
    Raid Data LV 1
      Logical volume    lv1_rimage_1
      Logical extents   0 to 12
    Raid Metadata LV 0  lv1_rmeta_0
    Raid Metadata LV 1  lv1_rmeta_1
```

```
[root@centos8 ~]# pvdisplay -m /dev/sdb6 /dev/sdb7 /dev/sdb9
  --- Physical volume ---
  PV Name               /dev/sdb6
  VG Name               vg0
  PV Size               200.00 MiB / not usable 8.00 MiB
  Allocatable           yes
  PE Size               8.00 MiB
  Total PE              24
  Free PE               10
  Allocated PE          14
  PV UUID               lxuKRI-l3Dd-jhsv-OWtw-au2c-0ti0-XGnt1E
  --- Physical Segments ---
  Physical extent 0 to 0:
    Logical volume  /dev/vg0/lv1_rmeta_0
    Logical extents 0 to 0
  Physical extent 1 to 13:
    Logical volume  /dev/vg0/lv1_rimage_0
    Logical extents 0 to 12
  Physical extent 14 to 23:
    FREE
```

```
  --- Physical volume ---
  PV Name               /dev/sdb7
  VG Name               vg0
  PV Size               300.00 MiB / not usable 4.00 MiB
  Allocatable           yes
  PE Size               8.00 MiB
  Total PE              37
  Free PE               23
  Allocated PE          14
  PV UUID               QDmfcX-Pv8o-hapq-TJOI-RaPH-qecT-VUMY4v
  --- Physical Segments ---
  Physical extent 0 to 0:
    Logical volume  /dev/vg0/lv1_rmeta_1
    Logical extents 0 to 0
  Physical extent 1 to 13:
    Logical volume  /dev/vg0/lv1_rimage_1
    Logical extents 0 to 12
  Physical extent 14 to 36:
    FREE
  --- Physical volume ---
  PV Name               /dev/sdb9
  VG Name               vg0
  PV Size               400.00 MiB / not usable 8.00 MiB
  Allocatable           yes
  PE Size               8.00 MiB
  Total PE              49
  Free PE               49
  Allocated PE          0
  PV UUID               ZTQV1b-Ha76-BQtB-zJEU-kfyK-ausJ-CxnRwg
  --- Physical Segments ---
  Physical extent 0 to 48:
    FREE
```

```
[root@centos8 ~]# lvconvert -m 0 /dev/vg0/lv1 /dev/sdb7
```

```
Are you sure you want to convert raid1 LV vg0/lv1 to type linear losing all resilience? [y/n]: y
  Logical volume vg0/lv1 successfully converted.
```

```
[root@centos8 ~]# lvconvert -m 1 /dev/vg0/lv1
Are you sure you want to convert linear LV vg0/lv1 to raid1 with 2 images enhancing resilience? [y/n]: y
  Logical volume vg0/lv1 successfully converted.
```

```
[root@centos8 ~]# lvconvert -m 0 /dev/vg0/lv1 /dev/sdb7
Are you sure you want to convert raid1 LV vg0/lv1 to type linear losing all resilience? [y/n]: y
  Logical volume vg0/lv1 successfully converted.
```

The command line switches of this command are:

```
[root@centos8 ~]# lvconvert --help
  lvconvert - Change logical volume layout

  Convert LV to linear.
  lvconvert --type linear LV
    [ COMMON_OPTIONS ]
    [ PV ... ]

  Convert LV to striped.
  lvconvert --type striped LV
    [ -I|--stripesize Size[k|UNIT] ]
    [ -R|--regionsize Size[m|UNIT] ]
    [ -i|--interval Number ]
    [    --stripes Number ]
    [ COMMON_OPTIONS ]
    [ PV ... ]

  Convert LV to type mirror (also see type raid1),
  lvconvert --type mirror LV
    [ -m|--mirrors [+|-]Number ]
    [ -I|--stripesize Size[k|UNIT] ]
```

```
  [ -R|--regionsize Size[m|UNIT] ]
  [ -i|--interval Number ]
  [    --stripes Number ]
  [    --mirrorlog core|disk ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Convert LV to raid or change raid layout
(a specific raid level must be used, e.g. raid1).
lvconvert --type raid LV
  [ -m|--mirrors [+|-]Number ]
  [ -I|--stripesize Size[k|UNIT] ]
  [ -R|--regionsize Size[m|UNIT] ]
  [ -i|--interval Number ]
  [    --stripes Number ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Convert LV to raid1 or mirror, or change number of mirror images.
lvconvert -m|--mirrors [+|-]Number LV
  [ -R|--regionsize Size[m|UNIT] ]
  [ -i|--interval Number ]
  [    --mirrorlog core|disk ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Convert raid LV to change number of stripe images.
lvconvert --stripes Number LV_raid
  [ -i|--interval Number ]
  [ -R|--regionsize Size[m|UNIT] ]
  [ -I|--stripesize Size[k|UNIT] ]
  [ COMMON_OPTIONS ]
  [ PV ... ]
```

```
Convert raid LV to change the stripe size.
lvconvert -I|--stripesize Size[k|UNIT] LV_raid
  [ -i|--interval Number ]
  [ -R|--regionsize Size[m|UNIT] ]
  [ COMMON_OPTIONS ]

Split images from a raid1 or mirror LV and use them to create a new LV.
lvconvert --splitmirrors Number -n|--name LV_new LV_cache_mirror_raid1
  [ COMMON_OPTIONS ]
  [ PV ... ]

Split images from a raid1 LV and track changes to origin for later merge.
lvconvert --splitmirrors Number --trackchanges LV_cache_raid1
  [ COMMON_OPTIONS ]
  [ PV ... ]

Merge LV images that were split from a raid1 LV.
lvconvert --mergemirrors VG|LV_linear_raid|Tag ...
  [ COMMON_OPTIONS ]

Convert LV to a thin LV, using the original LV as an external origin.
lvconvert --type thin --thinpool LV LV_linear_striped_thin_cache_raid
  [ -T|--thin ]
  [ -r|--readahead auto|none|Number ]
  [ -c|--chunksize Size[k|UNIT] ]
  [ -Z|--zero y|n ]
  [    --originname LV_new ]
  [    --poolmetadata LV ]
  [    --poolmetadatasize Size[m|UNIT] ]
  [    --poolmetadataspare y|n ]
  [    --metadataprofile String ]
  [ COMMON_OPTIONS ]

Attach a cache pool to an LV, converts the LV to type cache.
```

```
lvconvert --type cache --cachepool LV LV_linear_striped_thinpool_vdo_vdopool_vdopooldata_raid
  [ -H|--cache ]
  [ -Z|--zero y|n ]
  [ -r|--readahead auto|none|Number ]
  [ -c|--chunksize Size[k|UNIT] ]
  [    --cachemetadataformat auto|1|2 ]
  [    --cachemode writethrough|writeback|passthrough ]
  [    --cachepolicy String ]
  [    --cachesettings String ]
  [    --poolmetadata LV ]
  [    --poolmetadatasize Size[m|UNIT] ]
  [    --poolmetadataspare y|n ]
  [    --metadataprofile String ]
  [ COMMON_OPTIONS ]

Attach a writecache to an LV, converts the LV to type writecache.
lvconvert --type writecache --cachevol LV LV_linear_striped_raid
  [    --cachesettings String ]
  [ COMMON_OPTIONS ]

Attach a cache to an LV, converts the LV to type cache.
lvconvert --type cache --cachevol LV LV_linear_striped_thinpool_raid
  [ -H|--cache ]
  [ -Z|--zero y|n ]
  [ -c|--chunksize Size[k|UNIT] ]
  [    --cachemetadataformat auto|1|2 ]
  [    --cachemode writethrough|writeback|passthrough ]
  [    --cachepolicy String ]
  [    --cachesettings String ]
  [    --poolmetadatasize Size[m|UNIT] ]
  [ COMMON_OPTIONS ]

Add a writecache to an LV, using a specified cache device.
lvconvert --type writecache --cachedevice PV LV_linear_striped_raid
```

```
  [    --cachesize Size[m|UNIT] ]
  [    --cachesettings String ]
  [ COMMON_OPTIONS ]

Add a cache to an LV, using a specified cache device.
lvconvert --type cache --cachedevice PV LV_linear_striped_thinpool_raid
  [    --cachesize Size[m|UNIT] ]
  [    --cachesettings String ]
  [ COMMON_OPTIONS ]

Convert LV to type thin-pool.
lvconvert --type thin-pool LV_linear_striped_cache_raid
  [ -I|--stripesize Size[k|UNIT] ]
  [ -r|--readahead auto|none|Number ]
  [ -c|--chunksize Size[k|UNIT] ]
  [ -Z|--zero y|n ]
  [    --stripes Number ]
  [    --discards passdown|nopassdown|ignore ]
  [    --poolmetadata LV ]
  [    --poolmetadatasize Size[m|UNIT] ]
  [    --poolmetadataspare y|n ]
  [    --metadataprofile String ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Convert LV to type cache-pool.
lvconvert --type cache-pool LV_linear_striped_raid
  [ -Z|--zero y|n ]
  [ -r|--readahead auto|none|Number ]
  [ -c|--chunksize Size[k|UNIT] ]
  [    --cachemetadataformat auto|1|2 ]
  [    --cachemode writethrough|writeback|passthrough ]
  [    --cachepolicy String ]
  [    --cachesettings String ]
```

```
  [    --poolmetadata LV ]
  [    --poolmetadatasize Size[m|UNIT] ]
  [    --poolmetadataspare y|n ]
  [    --metadataprofile String ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Convert LV to type vdopool.
lvconvert --type vdo-pool LV_linear_striped_cache_raid
  [ -n|--name LV_new ]
  [ -V|--virtualsize Size[m|UNIT] ]
  [    --compression y|n ]
  [    --deduplication y|n ]
  [ COMMON_OPTIONS ]

Detach a cache from an LV.
lvconvert --splitcache LV_thinpool_cache_cachepool_vdopool_writecache
  [ COMMON_OPTIONS ]

Merge thin LV into its origin LV.
lvconvert --mergethin LV_thin ...
  [ COMMON_OPTIONS ]

Merge COW snapshot LV into its origin.
lvconvert --mergesnapshot LV_snapshot ...
  [ -i|--interval Number ]
  [ COMMON_OPTIONS ]

Combine a former COW snapshot (second arg) with a former
origin LV (first arg) to reverse a splitsnapshot command.
lvconvert --type snapshot LV LV_linear_striped
  [ -s|--snapshot ]
  [ -c|--chunksize Size[k|UNIT] ]
  [ -Z|--zero y|n ]
```

```
  [ COMMON_OPTIONS ]

Replace failed PVs in a raid or mirror LV.
Repair a thin pool.
Repair a cache pool.
lvconvert --repair LV_thinpool_cache_cachepool_mirror_raid
  [ -i|--interval Number ]
  [    --usepolicies ]
  [    --poolmetadataspare y|n ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Replace specific PV(s) in a raid LV with another PV.
lvconvert --replace PV LV_raid
  [ COMMON_OPTIONS ]
  [ PV ... ]

Poll LV to continue conversion.
lvconvert --startpoll LV_mirror_raid
  [ COMMON_OPTIONS ]

Add or remove data integrity checksums to raid images.
lvconvert --raidintegrity y|n LV_raid
  [    --raidintegritymode String ]
  [    --raidintegrityblocksize Number ]
  [ COMMON_OPTIONS ]
  [ PV ... ]

Common options for command:
  [ -b|--background ]
  [ -f|--force ]
  [    --alloc contiguous|cling|cling_by_tags|normal|anywhere|inherit ]
  [    --noudevsync ]
```

```
  Common options for lvm:
    [ -d|--debug ]
    [ -h|--help ]
    [ -q|--quiet ]
    [ -v|--verbose ]
    [ -y|--yes ]
    [ -t|--test ]
    [    --commandprofile String ]
    [    --config String ]
    [    --driverloaded y|n ]
    [    --nolocking ]
    [    --lockopt String ]
    [    --longhelp ]
    [    --profile String ]
    [    --version ]

  Use --longhelp to show all options and advanced commands.
```

LAB #8 - Changing LVM Attributes

```
[root@centos8 ~]# lvs
  LV   VG         Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  root cl_centos8 -wi-ao----  27.79g
  swap cl_centos8 -wi-ao----   3.20g
  lv1  vg0        -wi-a----- 104.00m
```

See **this page** .

```
[root@centos8 ~]# vgs
  VG         #PV #LV #SN Attr   VSize   VFree
```

```
  cl_centos8   1   2   0 wz--n- <31.00g      0
  vg0          3   1   0 wz--n- 880.00m 776.00m
```

See **this page**.

```
[root@centos8 ~]# pvs
  PV         VG         Fmt  Attr PSize   PFree
  /dev/sda2  cl_centos8 lvm2 a--  <31.00g      0
  /dev/sdb6  vg0        lvm2 a--  192.00m  88.00m
  /dev/sdb7  vg0        lvm2 a--  296.00m 296.00m
  /dev/sdb9  vg0        lvm2 a--  392.00m 392.00m
```

See **this page**.

```
[root@centos8 ~]# lvchange -a n /dev/vg0/lv1
```

```
[root@centos8 ~]# lvchange -a y /dev/vg0/lv1
```

The command line switches of this command are:

```
[root@centos8 ~]# lvchange --help
  lvchange - Change the attributes of logical volume(s)

  Change a general LV attribute.
  For options listed in parentheses, any one is
  required, after which the others are optional.
  lvchange
    ( -C|--contiguous y|n,
```

```
     -p|--permission rw|r,
     -r|--readahead auto|none|Number,
     -k|--setactivationskip y|n,
     -Z|--zero y|n,
     -M|--persistent n,
        --addtag Tag,
        --deltag Tag,
        --alloc contiguous|cling|cling_by_tags|normal|anywhere|inherit,
        --compression y|n,
        --deduplication y|n,
        --detachprofile,
        --metadataprofile String,
        --profile String,
        --errorwhenfull y|n,
        --discards passdown|nopassdown|ignore,
        --cachemode writethrough|writeback|passthrough,
        --cachepolicy String,
        --cachesettings String,
        --minrecoveryrate Size[k|UNIT],
        --maxrecoveryrate Size[k|UNIT],
        --writebehind Number,
        --writemostly PV[:t|n|y] )
    VG|LV|Tag|Select ...
  [ -a|--activate y|n|ay ]
  [    --poll y|n ]
  [    --monitor y|n ]
  [ COMMON_OPTIONS ]

Resyncronize a mirror or raid LV.
Use to reset 'R' attribute on a not initially synchronized LV.
lvchange --resync VG|LV_mirror_raid|Tag|Select ...
  [ -a|--activate y|n|ay ]
  [ COMMON_OPTIONS ]
```

```
Resynchronize or check a raid LV.
lvchange --syncaction check|repair VG|LV_raid|Tag|Select ...
  [ COMMON_OPTIONS ]

Reconstruct data on specific PVs of a raid LV.
lvchange --rebuild PV VG|LV_raid|Tag|Select ...
  [ COMMON_OPTIONS ]

Activate or deactivate an LV.
lvchange -a|--activate y|n|ay VG|LV|Tag|Select ...
  [ -P|--partial ]
  [ -K|--ignoreactivationskip ]
  [    --activationmode partial|degraded|complete ]
  [    --poll y|n ]
  [    --monitor y|n ]
  [    --ignorelockingfailure ]
  [    --sysinit ]
  [    --readonly ]
  [ COMMON_OPTIONS ]

Reactivate an LV using the latest metadata.
lvchange --refresh VG|LV|Tag|Select ...
  [ -P|--partial ]
  [    --activationmode partial|degraded|complete ]
  [    --poll y|n ]
  [    --monitor y|n ]
  [ COMMON_OPTIONS ]

Start or stop monitoring an LV from dmeventd.
lvchange --monitor y|n VG|LV|Tag|Select ...
  [ COMMON_OPTIONS ]

Start or stop processing an LV conversion.
lvchange --poll y|n VG|LV|Tag|Select ...
```

```
  [    --monitor y|n ]
  [ COMMON_OPTIONS ]

Make the minor device number persistent for an LV.
lvchange -M|--persistent y --minor Number LV
  [ -j|--major Number ]
  [ -a|--activate y|n|ay ]
  [    --poll y|n ]
  [    --monitor y|n ]
  [ COMMON_OPTIONS ]

Common options for command:
  [ -A|--autobackup y|n ]
  [ -f|--force ]
  [ -S|--select String ]
  [    --ignoremonitoring ]
  [    --noudevsync ]
  [    --reportformat basic|json ]

Common options for lvm:
  [ -d|--debug ]
  [ -h|--help ]
  [ -q|--quiet ]
  [ -v|--verbose ]
  [ -y|--yes ]
  [ -t|--test ]
  [    --commandprofile String ]
  [    --config String ]
  [    --driverloaded y|n ]
  [    --nolocking ]
  [    --lockopt String ]
  [    --longhelp ]
  [    --profile String ]
  [    --version ]
```

```
  Use --longhelp to show all options and advanced commands.
```

LAB #9 - Striped Volumes

- **-i** - number of stripes,
- **-I** - size of stripe in KB.

```
[root@centos8 ~]# lvcreate -i2 -I64 -n lv2 -L 100M vg0 /dev/sdb7 /dev/sdb9
  Rounding up size to full physical extent 104.00 MiB
  Rounding size 104.00 MiB (13 extents) up to stripe boundary size 112.00 MiB(14 extents).
  Logical volume "lv2" created.
```

```
[root@centos8 ~]# lvdisplay -m /dev/vg0/lv2
  --- Logical volume ---
  LV Path                /dev/vg0/lv2
  LV Name                lv2
  VG Name                vg0
  LV UUID                MmXbPt-ZF8u-rnIv-3YU9-m64J-RCz2-6NzAuG
  LV Write Access        read/write
  LV Creation host, time centos8.ittraining.loc, 2021-06-02 07:47:38 -0400
  LV Status              available
  # open                 0
  LV Size                112.00 MiB
  Current LE             14
  Segments               1
  Allocation             inherit
  Read ahead sectors     auto
  - currently set to     8192
  Block device           253:1
  --- Segments ---
  Logical extents 0 to 13:
    Type        striped
    Stripes     2
```

```
    Stripe size     64.00 KiB
    Stripe 0:
      Physical volume   /dev/sdb7
      Physical extents  0 to 6
    Stripe 1:
      Physical volume   /dev/sdb9
      Physical extents  0 to 6
```

```
[root@centos8 ~]# lvs -o +devices
  LV   VG         Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert Devices
  root cl_centos8 -wi-ao----  27.79g                                                     /dev/sda2(820)
  swap cl_centos8 -wi-ao----   3.20g                                                     /dev/sda2(0)
  lv1  vg0        -wi-a----- 104.00m                                                     /dev/sdb6(1)
  lv2  vg0        -wi-a----- 112.00m
/dev/sdb7(0),/dev/sdb9(0)
```

Journaled Filrsystems

Ext3

Managing Ext3

```
[root@centos8 ~]# fdisk -l
Disk /dev/sdb: 4 GiB, 4294967296 bytes, 8388608 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xb0dacb39

Device     Boot   Start     End Sectors  Size Id Type
```

```
/dev/sdb1          2048  206847  204800  100M 83 Linux
/dev/sdb2        206848  411647  204800  100M 83 Linux
/dev/sdb3        411648  616447  204800  100M 83 Linux
/dev/sdb4        616448 8388607 7772160  3.7G  5 Extended
/dev/sdb5        618496 1642495 1024000  500M fd Linux raid autodetect
/dev/sdb6       1644544 2054143  409600  200M 8e Linux LVM
/dev/sdb7       2056192 2670591  614400  300M 8e Linux LVM
/dev/sdb8       2672640 3696639 1024000  500M fd Linux raid autodetect
/dev/sdb9       3698688 4517887  819200  400M 8e Linux LVM
/dev/sdb10      4519936 5543935 1024000  500M fd Linux raid autodetect
/dev/sdb11      5545984 6569983 1024000  500M fd Linux raid autodetect
/dev/sdb12      6572032 6981631  409600  200M 83 Linux


Disk /dev/sda: 20 GiB, 21474836480 bytes, 41943040 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x70b17285

Device     Boot   Start      End  Sectors  Size Id Type
/dev/sda1  *       2048   616447   614400  300M 83 Linux
/dev/sda2        616448  4712447  4096000    2G 82 Linux swap / Solaris
/dev/sda3       4712448 35432447 30720000 14.7G 83 Linux




Disk /dev/mapper/vg0-lv1: 104 MiB, 109051904 bytes, 212992 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

```
Disk /dev/mapper/vg0-lv2: 112 MiB, 117440512 bytes, 229376 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 65536 bytes / 131072 bytes
```

Créez un filesystem Ext3 sur /dev/sdb12 en utilisant la commande **mke2fs -j** :

```
[root@centos8 ~]# mke2fs -j /dev/sdb12
mke2fs 1.45.6 (20-Mar-2020)
Creating filesystem with 204800 1k blocks and 51200 inodes
Filesystem UUID: a2515f45-a32a-4e87-b7e6-170448f3f803
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done
```

The command line switches of this command are:

```
[root@centos8 ~]# mke2fs --help
mke2fs: invalid option -- '-'
Usage: mke2fs [-c|-l filename] [-b block-size] [-C cluster-size]
    [-i bytes-per-inode] [-I inode-size] [-J journal-options]
    [-G flex-group-size] [-N number-of-inodes] [-d root-directory]
    [-m reserved-blocks-percentage] [-o creator-os]
    [-g blocks-per-group] [-L volume-label] [-M last-mounted-directory]
    [-O feature[,...]] [-r fs-revision] [-E extended-option[,...]]
    [-t fs-type] [-T usage-type ] [-U UUID] [-e errors_behavior][-z undo_file]
    [-jnqvDFSV] device [blocks-count]
```

LAB #11 - Converting Ext3 to Ext2

```
[root@centos8 ~]# dumpe2fs -h /dev/sdb12
dumpe2fs 1.45.6 (20-Mar-2020)
Filesystem volume name:   <none>
Last mounted on:          <not available>
Filesystem UUID:          a2515f45-a32a-4e87-b7e6-170448f3f803
Filesystem magic number:  0xEF53
Filesystem revision #:    1 (dynamic)
Filesystem features:      has_journal ext_attr resize_inode dir_index filetype sparse_super large_file
Filesystem flags:         signed_directory_hash
Default mount options:    user_xattr acl
Filesystem state:         clean
Errors behavior:          Continue
Filesystem OS type:       Linux
Inode count:              51200
Block count:              204800
Reserved block count:     10240
Free blocks:              192674
Free inodes:              51189
First block:              1
Block size:               1024
Fragment size:            1024
Reserved GDT blocks:      256
Blocks per group:         8192
Fragments per group:      8192
Inodes per group:         2048
Inode blocks per group:   256
Filesystem created:       Wed Jun  2 07:55:24 2021
Last mount time:          n/a
Last write time:          Wed Jun  2 07:55:24 2021
Mount count:              0
Maximum mount count:      -1
```

```
Last checked:             Wed Jun  2 07:55:24 2021
Check interval:           0 (<none>)
Reserved blocks uid:      0 (user root)
Reserved blocks gid:      0 (group root)
First inode:              11
Inode size:           128
Journal inode:            8
Default directory hash:   half_md4
Directory Hash Seed:      faee0b81-0538-4c06-8d86-468bc0c760ac
Journal backup:           inode blocks
Journal features:         (none)
Journal size:             4096k
Journal length:           4096
Journal sequence:         0x00000001
Journal start:            0
```

Important : The **Filesystem features: has_journal ...** shows that Ext3 is on the partition.

The command line switches of this command are:

```
[root@centos8 ~]# dumpe2fs --help
dumpe2fs 1.45.6 (20-Mar-2020)
dumpe2fs: invalid option -- '-'
Usage: dumpe2fs [-bfghimxV] [-o superblock=<num>] [-o blocksize=<num>] device
```

```
[root@centos8 ~]# tune2fs -O ^has_journal /dev/sdb12
tune2fs 1.45.6 (20-Mar-2020)
```

The command line switches of this command are:

```
[root@centos8 ~]# tune2fs --help
tune2fs 1.45.6 (20-Mar-2020)
tune2fs: invalid option -- '-'
Usage: tune2fs [-c max_mounts_count] [-e errors_behavior] [-f] [-g group]
    [-i interval[d|m|w]] [-j] [-J journal_options] [-l]
    [-m reserved_blocks_percent] [-o [^]mount_options[,...]]
    [-r reserved_blocks_count] [-u user] [-C mount_count]
    [-L volume_label] [-M last_mounted_dir]
    [-O [^]feature[,...]] [-Q quota_options]
    [-E extended-option[,...]] [-T last_check_time] [-U UUID]
    [-I new_inode_size] [-z undo_file] device
```

```
[root@centos8 ~]# dumpe2fs -h /dev/sdb12
dumpe2fs 1.45.6 (20-Mar-2020)
Filesystem volume name:   <none>
Last mounted on:          <not available>
Filesystem UUID:          a2515f45-a32a-4e87-b7e6-170448f3f803
Filesystem magic number:  0xEF53
Filesystem revision #:    1 (dynamic)
Filesystem features:      ext_attr resize_inode dir_index filetype sparse_super large_file
Filesystem flags:         signed_directory_hash
Default mount options:    user_xattr acl
Filesystem state:         clean
Errors behavior:          Continue
Filesystem OS type:       Linux
Inode count:              51200
Block count:              204800
Reserved block count:     10240
Free blocks:              196787
Free inodes:              51189
First block:              1
Block size:               1024
Fragment size:            1024
Reserved GDT blocks:      256
```

```
Blocks per group:         8192
Fragments per group:      8192
Inodes per group:         2048
Inode blocks per group:   256
Filesystem created:       Wed Jun  2 07:55:24 2021
Last mount time:          n/a
Last write time:          Wed Jun  2 07:59:01 2021
Mount count:              0
Maximum mount count:      -1
Last checked:             Wed Jun  2 07:55:24 2021
Check interval:           0 (<none>)
Reserved blocks uid:      0 (user root)
Reserved blocks gid:      0 (group root)
First inode:              11
Inode size:           128
Default directory hash:   half_md4
Directory Hash Seed:      faee0b81-0538-4c06-8d86-468bc0c760ac
Journal backup:           inode blocks
```

```
[root@centos8 ~]# fsck /dev/sdb12
fsck from util-linux 2.32.1
e2fsck 1.45.6 (20-Mar-2020)
/dev/sdb12: clean, 11/51200 files, 8013/204800 blocks
```

```
[root@centos8 ~]# mkdir /mnt/sdb12
```

```
[root@centos8 ~]# mount -t ext3 /dev/sdb12 /mnt/sdb12
mount: /mnt/sdb12: wrong fs type, bad option, bad superblock on /dev/sdb12, missing codepage or helper program,
or other error.
```

```
[root@centos8 ~]# mount -t ext2 /dev/sdb12 /mnt/sdb12
```

LAB #12 - Converting Ext2 to Ext3

```
[root@centos8 ~]# umount /mnt/sdb12

[root@centos8 ~]# tune2fs -j /dev/sdb12
tune2fs 1.45.6 (20-Mar-2020)
Creating journal inode: done
```

LAB #13 - Using another Partition for the Journal

```
[root@centos8 ~]# mke2fs -O journal_dev /dev/sdb11
mke2fs 1.45.6 (20-Mar-2020)
Creating filesystem with 512000 1k blocks and 0 inodes
Filesystem UUID: 23327281-e88a-4da0-bafa-50ee10c52937
Superblock backups stored on blocks:

Zeroing journal device:
```

Important : Note the **-O** switch.

```
[root@centos8 ~]# mke2fs -j -J device=/dev/sdb11 /dev/sdb12
mke2fs 1.45.6 (20-Mar-2020)
Using journal device's blocksize: 1024
/dev/sdb12 contains a ext3 file system
    last mounted on Wed Jun  2 08:03:11 2021
Proceed anyway? (y,N) y
Creating filesystem with 204800 1k blocks and 51200 inodes
Filesystem UUID: 0e783411-6407-4cba-8db5-0e2729000c9e
Superblock backups stored on blocks:
```

```
    8193, 24577, 40961, 57345, 73729

Allocating group tables: done
Writing inode tables: done
Adding journal to device /dev/sdb11: done
Writing superblocks and filesystem accounting information: done
```

LAB #14 - Changing the File System Check interval on an ext3 Filesystem

Use the **-c** or **-i** switches:

```
[root@centos8 ~]# tune2fs -i 100d /dev/sdb12
tune2fs 1.45.6 (20-Mar-2020)
Setting interval between checks to 8640000 seconds
```

```
[root@centos8 ~]# dumpe2fs /dev/sdb12 | grep UUID
dumpe2fs 1.45.6 (20-Mar-2020)
Filesystem UUID:          0e783411-6407-4cba-8db5-0e2729000c9e
Journal UUID:             23327281-e88a-4da0-bafa-50ee10c52937
```

Ext4

LAB #15 - Creating an Ext4 Filesystem

```
[root@centos8 ~]# mkfs.ext4 /dev/sdb11
mke2fs 1.45.6 (20-Mar-2020)
/dev/sdb11 contains a jbd file system
Proceed anyway? (y,N) y
Creating filesystem with 512000 1k blocks and 128016 inodes
Filesystem UUID: 72a6ad08-7023-4561-adcb-d434e00afed1
Superblock backups stored on blocks:
```

```
    8193, 24577, 40961, 57345, 73729, 204801, 221185, 401409

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

The command line switches of this command are:

```
[root@centos8 ~]# mkfs.ext4 --help
mkfs.ext4: invalid option -- '-'
Usage: mkfs.ext4 [-c|-l filename] [-b block-size] [-C cluster-size]
    [-i bytes-per-inode] [-I inode-size] [-J journal-options]
    [-G flex-group-size] [-N number-of-inodes] [-d root-directory]
    [-m reserved-blocks-percentage] [-o creator-os]
    [-g blocks-per-group] [-L volume-label] [-M last-mounted-directory]
    [-O feature[,...]] [-r fs-revision] [-E extended-option[,...]]
    [-t fs-type] [-T usage-type ] [-U UUID] [-e errors_behavior][-z undo_file]
    [-jnqvDFSV] device [blocks-count]
```

```
[root@centos8 ~]# dumpe2fs /dev/sdb11 | more
dumpe2fs 1.45.6 (20-Mar-2020)
Filesystem volume name:   <none>
Last mounted on:          <not available>
Filesystem UUID:          72a6ad08-7023-4561-adcb-d434e00afed1
Filesystem magic number:  0xEF53
Filesystem revision #:    1 (dynamic)
Filesystem features:      has_journal ext_attr resize_inode dir_index filetype e
xtent 64bit flex_bg sparse_super large_file huge_file dir_nlink extra_isize meta
data_csum
Filesystem flags:         signed_directory_hash
Default mount options:    user_xattr acl
Filesystem state:         clean
Errors behavior:          Continue
```

```
Filesystem OS type:       Linux
Inode count:              128016
Block count:              512000
Reserved block count:     25600
Free blocks:              485316
Free inodes:              128005
First block:              1
Block size:               1024
Fragment size:            1024
Group descriptor size:    64
Reserved GDT blocks:      256
--More--
```

LAB #16 - Adding a Label to an Ext4 Filesystem

```
[root@centos8 ~]# e2label /dev/sdb11 my_ext4
[root@centos8 ~]# dumpe2fs /dev/sdb11 | more
dumpe2fs 1.45.6 (20-Mar-2020)
Filesystem volume name:   my_ext4
Last mounted on:          <not available>
Filesystem UUID:          72a6ad08-7023-4561-adcb-d434e00afed1
Filesystem magic number:  0xEF53
Filesystem revision #:    1 (dynamic)
Filesystem features:      has_journal ext_attr resize_inode dir_index filetype e
xtent 64bit flex_bg sparse_super large_file huge_file dir_nlink extra_isize meta
data_csum
Filesystem flags:         signed_directory_hash
Default mount options:    user_xattr acl
Filesystem state:         clean
Errors behavior:          Continue
Filesystem OS type:       Linux
Inode count:              128016
Block count:              512000
```

```
Reserved block count:     25600
Free blocks:              485316
Free inodes:              128005
First block:              1
Block size:               1024
Fragment size:            1024
Group descriptor size:    64
Reserved GDT blocks:      256
--More--
```

Important - Note that the labal is limited to 16 characters.

```
[root@centos8 ~]# mkdir /mnt/sdb11

[root@centos8 ~]# mount -t ext3 /dev/sdb11 /mnt/sdb11
mount: /mnt/sdb11: wrong fs type, bad option, bad superblock on /dev/sdb11, missing codepage or helper program,
or other error..
```

```
[root@centos8 ~]# mount /dev/sdb11 /mnt/sdb11

[root@centos8 ~]# mount | grep sdb11
/dev/sdb11 on /mnt/sdb11 type ext4 (rw,relatime,seclabel)
```

LAB #17 - Converting Ext3 to Ext4

```
[root@centos8 ~]# mkfs.ext3 /dev/sdb12
mke2fs 1.45.6 (20-Mar-2020)
/dev/sdb12 contains a ext3 file system
    created on Wed Jun  2 08:10:40 2021
Proceed anyway? (y,N) y
```

```
Creating filesystem with 204800 1k blocks and 51200 inodes
Filesystem UUID: b73322d4-f2e4-43bc-96ae-422d4584f3de
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done
```

```
[root@centos8 ~]# mount /dev/sdb12 /mnt/sdb12

[root@centos8 ~]# ls -l /mnt/sdb12
total 12
drwx------. 2 root root 12288 Jun  2 08:42 lost+found
```

```
[root@centos8 ~]# touch /mnt/sdb12/check_file
```

```
[root@centos8 ~]# echo "check file" > /mnt/sdb12/check_file

[root@centos8 ~]# umount /dev/sdb12
```

```
[root@centos8 ~]# e2fsck /dev/sdb12
e2fsck 1.45.6 (20-Mar-2020)
/dev/sdb12: clean, 12/51200 files, 12128/204800 blocks
```

```
[root@centos8 ~]# tune2fs -O extents,uninit_bg,dir_index /dev/sdb12
tune2fs 1.45.6 (20-Mar-2020)
```

```
[root@centos8 ~]# e2fsck -fDC0 /dev/sdb12
e2fsck 1.45.6 (20-Mar-2020)
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
Pass 3: Checking directory connectivity
```

```
Pass 3A: Optimizing directories
Pass 4: Checking reference counts
Pass 5: Checking group summary information
/dev/sdb12: ***** FILE SYSTEM WAS MODIFIED *****
/dev/sdb12: 12/51200 files (0.0% non-contiguous), 12128/204800 blocks
```

```
[root@centos8 ~]# mount -t ext3 /dev/sdb12 /mnt/sdb12
mount: /mnt/sdb12: wrong fs type, bad option, bad superblock on /dev/sdb12, missing codepage or helper program,
or other error.
```

```
[root@centos8 ~]# mount /dev/sdb12 /mnt/sdb12

[root@centos8 ~]# ls -l /mnt/sdb12
total 14
-rw-r--r--. 1 root root    11 Jun  2 08:45 check_file
drwx------. 2 root root 12288 Jun  2 08:42 lost+found

[root@centos8 ~]# cat /mnt/sdb12/check_file
check file
```

```
[root@centos8 ~]# dumpe2fs /dev/sdb11 | grep UUID
dumpe2fs 1.45.6 (20-Mar-2020)
Filesystem UUID:          72a6ad08-7023-4561-adcb-d434e00afed1

[root@centos8 ~]# dumpe2fs /dev/sdb12 | grep UUID
dumpe2fs 1.45.6 (20-Mar-2020)
Filesystem UUID:          b73322d4-f2e4-43bc-96ae-422d4584f3de
```

XFS

Important : XFS allows you to extend a filesystem but not reduce it.

LAB #18 - Creating an XFS Filesystem

```
[root@centos8 ~]# umount /dev/sdb12
```

```
[root@centos8 ~]# mkfs.xfs -f /dev/sdb12
meta-data=/dev/sdb12             isize=512    agcount=4, agsize=12800 blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=1, sparse=1, rmapbt=0
         =                       reflink=1
data     =                       bsize=4096   blocks=51200, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0, ftype=1
log      =internal log           bsize=4096   blocks=1368, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
```

Important - Note the use of the **-f** switch.

The command line switches of this command are:

```
[root@centos8 ~]# mkfs.xfs --help
mkfs.xfs: invalid option -- '-'
unknown option --
Usage: mkfs.xfs
/* blocksize */     [-b size=num]
/* metadata */      [-m crc=0|1,finobt=0|1,uuid=xxx,rmapbt=0|1,reflink=0|1]
/* data subvol */   [-d agcount=n,agsize=n,file,name=xxx,size=num,
                (sunit=value,swidth=value|su=num,sw=num|noalign),
                sectsize=num
/* force overwrite */   [-f]
```

```
/* inode size */    [-i log=n|perblock=n|size=num,maxpct=n,attr=0|1|2,
                 projid32bit=0|1,sparse=0|1]
/* no discard */    [-K]
/* log subvol */    [-l agnum=n,internal,size=num,logdev=xxx,version=n
                 sunit=value|su=num,sectsize=num,lazy-count=0|1]
/* label */     [-L label (maximum 12 characters)]
/* naming */        [-n size=num,version=2|ci,ftype=0|1]
/* no-op info only */   [-N]
/* prototype file */    [-p fname]
/* quiet */     [-q]
/* realtime subvol */   [-r extsize=num,size=num,rtdev=xxx]
/* sectorsize */    [-s size=num]
/* version */       [-V]
            devicename
<devicename> is required unless -d name=xxx is given.
<num> is xxx (bytes), xxxs (sectors), xxxb (fs blocks), xxxk (xxx KiB),
      xxxm (xxx MiB), xxxg (xxx GiB), xxxt (xxx TiB) or xxxp (xxx PiB).
<value> is xxx (512 byte blocks).
```

```
[root@centos8 ~]# xfs_info /dev/sdb12
meta-data=/dev/sdb12             isize=512    agcount=4, agsize=12800 blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=1, sparse=1, rmapbt=0
         =                       reflink=1
data     =                       bsize=4096   blocks=51200, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0, ftype=1
log      =internal log           bsize=4096   blocks=1368, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
```

The command line switches of this command are:

```
[root@centos8 ~]# xfs_info --help
```

```
/usr/sbin/xfs_info: illegal option -- -
Usage: xfs_info [-V] [-t mtab] [mountpoint|device|file]
```

===LAB #19 - Adding a Label to an XFS Filesyst

```
[root@centos8 ~]# xfs_admin -L my_xfs /dev/sdb12
xfs_admin: /dev/sdb12 contains a mounted filesystem

fatal error -- couldn't initialize XFS library

[root@centos8 ~]# umount /dev/sdb12

[root@centos8 ~]# xfs_admin -L my_xfs /dev/sdb12
writing all SBs
new label = "my_xfs"
```

Pour voir l'étiquette, utilisez la commande suivante :

```
[root@centos8 ~]# xfs_admin -l /dev/sdb12
label = "my_xfs"
```

Important - Note the Label cannot be longer that 12 characters.

The command line switches of this command are:

```
[root@centos8 ~]# xfs_admin --help
/usr/sbin/xfs_admin: illegal option -- -
Usage: xfs_admin [-efjlpuV] [-c 0|1] [-L label] [-U uuid] device
```

```
[root@centos8 ~]# xfs_admin -u /dev/sdb12
```

```
UUID = 15db1b62-0866-4aa4-9ac1-3ac325a4e20f
```
