

# ????

## Logical Volume - LV

```
# 查看 LV 信息
lvdisplay -C

# 创建 LV
lvcreate -L 10G -n LV_name VG_name

# 删除 LV
lvremove /dev/VG_name>/LV_name

# 重命名 LV
lvrename /dev/VG-name/old-LV-name /dev/VG-name/new-LV-name

# 查看 LV 信息
lvs
lvs -a -o name,copy_percent,devices
lvs -a -o name,copy_percent,devices <vg-name>
lvs -a --segments -o +devices

# 扩展 LV 容量
lvextend -L +2G /dev/vg/lv
lvextend -l +100%FREE /dev/vg_db2v9/lv_root 查看剩余空间

ext2online /dev/vg/lv (RHEL v4)
resize2fs /dev/vg/lv (RHEL v5,6)
xfs_growfs /dev/vg/lv (RHEL v7 with XFS filesystem)

# 缩小 LV 容量 (RHEL v4)
# 445GB -> 2GB
umount /worktmp
e2fsck -f /dev/rootVG/worktmpLV
resize2fs /dev/rootVG/worktmpLV 1843M
```

```

lvreduce -L 2GB /dev/rootVG/worktmpLV
resize2fs /dev/rootVG/worktmpLV
mount /worktmp

# 1843MB 2GB 90% GB

# Shrinking LV (RHEL 5/6)
# 100 GB -> 5GB
umount /opt/oracle/arclog
resize2fs /dev/VolGroup00/arclogLV 5G
lvreduce -L 5G /dev/VolGroup00/arclogLV
e2fsck -f /dev/VolGroup00/arclogLV
mount /opt/oracle/arclog

```

## Volume Group - VG

```

# VG
vgdisplay -C

# / VG
vgchange -a y VG_name
vgchange -a n VG_name
# vgdisplay /dev/**

# VG
vgcreate VG_name /dev/pv1 /dev/pv2

# VG
vgrename vg_esxa01db01 vg_root

# VG
vgremove VG_name

# PV VG
vgextend VG_name /dev/pv3

# VG PV
#NOTE: PV (pvs -o+pv_used)
vgreduce VG_name /dev/mypv

```

# Physical Volume - PV

```
# [ ] PV [ ]
pvdisplay -C

# [ ] PV [ ]
pvs -o+pv_used

# [ ] PV
pvcreate /dev/hdd1

# [ ] PV
pvremove /dev/hdd1

# [ ] disk [ ] PV[ ]
dd if=/dev/zero of=/dev/sdd bs=512 count=1

# [ ] LUN Disk [ ]
pvresize /dev/sd[X]
```

## LVM ???????

```
“ ? RHEL 8 ??? LVM ??????????:

Do you want to remove the signature? [Y]es/[N]o:

?: ????? N????????????????

?: ??? LVM ?????????????????????? reboot ???

pvs

????????? PV disk????????????
```

Extend PV Disk: /dev/sda2 50GB to 100GB

```
[root@my-db2v11fp7 ~]# lsblk
NAME          MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda           8:0    0 100G  0 disk
```

```
└─sda1      8:1  0  1G  0 part /boot
└─sda2      8:2  0 49G  0 part
  └─rootvg-root 253:0  0 15G  0 lvm /
  └─rootvg-swap 253:1  0  4G  0 lvm [SWAP]
    └─rootvg-worktmp 253:2  0 512M  0 lvm /worktmp
sr0        11:0  1 1024M  0 rom
```

[root@my-db2v11fp7 ~]# pvs

PV	VG	Fmt	Attr	PSize	PFree
/dev/sda2	rootvg	lvm2	a--	<49.00g	<29.50g

[root@my-db2v11fp7 ~]# fdisk -ul /dev/sda

Command (m for help): p

Disk /dev/sda: 107.4 GB, 107374182400 bytes, 209715200 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 label type: dos

Disk identifier: 0x000def6b

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	2048	2099199	1048576	83	Linux
/dev/sda2		2099200	104857599	51379200	8e	Linux LVM

Command (m for help): d

Partition number (1,2, default 2): 2

Partition 2 is deleted

Command (m for help): p

Disk /dev/sda: 107.4 GB, 107374182400 bytes, 209715200 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 label type: dos

Disk identifier: 0x000def6b

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	2048	2099199	1048576	83	Linux

Command (m for help): n

Partition type:

- p primary (1 primary, 0 extended, 3 free)
- e extended

Select (default p): p

Partition number (2-4, default 2): 2

First sector (2099200-209715199, default 2099200):

Using default value 2099200

Last sector, +sectors or +size{K,M,G} (2099200-209715199, default 209715199):

Using default value 209715199

Partition 2 of type Linux and of size 99 GiB is set

Command (m for help): t

Partition number (1,2, default 2): 2

Hex code (type L to list all codes): 8e

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

Command (m for help): p

Disk /dev/sda: 107.4 GB, 107374182400 bytes, 209715200 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 label type: dos

Disk identifier: 0x000def6b

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	2048	2099199	1048576	83	Linux
/dev/sda2		2099200	209715199	103808000	8e	Linux LVM

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@my-db2v11fp7 ~]# reboot
```

```
[root@my-db2v11fp7 ~]# lsblk
```

NAME	MAJ:MIN	RM	SIZE	RO	TYPE	MOUNTPOINT
sda	8:0	0	100G	0	disk	
└─sda1	8:1	0	1G	0	part	/boot
└─sda2	8:2	0	99G	0	part	
└─rootvg-root	253:0	0	15G	0	lvm	/
└─rootvg-swap	253:1	0	4G	0	lvm	[SWAP]
└─rootvg-worktmp	253:2	0	512M	0	lvm	/worktmp
sr0	11:0	1	1024M	0	rom	

```
[root@my-db2v11fp7 ~]# pvresize /dev/sda2
```

```
Physical volume "/dev/sda2" changed
```

```
1 physical volume(s) resized or updated / 0 physical volume(s) not resized
```

```
[root@my-db2v11fp7 ~]# pvs
```

PV	VG	Fmt	Attr	PSize	PFree
/dev/sda2	rootvg	lvm2	a--	<99.00g	<79.50g

?????

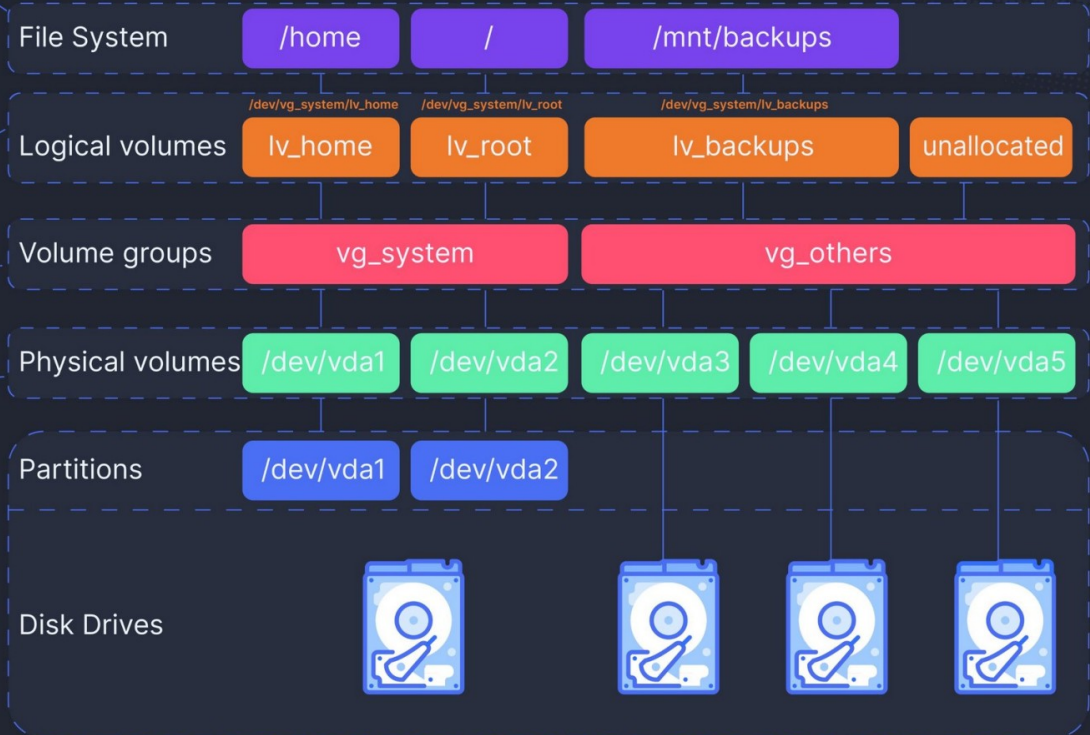
# Linux Logical Volume Manager

The filesystem sits on top of the logical volume and it will be formatted to a specific fs type (vfat, xfs, ext4) and mounted anywhere on the system

A Logical Volume sits inside a Volume Group and it's what is assigned to a file system.

A Volume Group can have multiple physical Volumes

Physical volumes are directly related to hard drives or partitions



## Volume Group Management Commands

Command	Description
<code>vgcreate</code>	Create a volume group
<code>vgscan</code>	Search for all volume groups
<code>vgdisplay</code> , <code>vgs</code>	Display information about vgs
<code>vgextend</code>	Add physical volumes to a vg
<code>vgremove</code>	Remove volume group(s)
<code>vgrename</code>	Rename a volume group
<code>vgchange</code>	Change volume group attributes
<code>vgck</code>	Check the consistency of vgs
<code>vgmerge</code>	Merge volume groups
<code>vgsplit</code>	Move pvs into a new or existing vg
<code>vgcfgbackup</code>	Backup vg configuration(s)
<code>vgcfgrestore</code>	Restore vg configuration
<code>vgconvert</code>	Convert vg metadata format
<code>vgexport</code>	Unregister vgs from the system
<code>vgimport</code>	Register exported vg with system
<code>vgimportclone</code>	Import a vg from cloned pvs
<code>vgmknodes</code>	Create the special files for vg devices in /dev

## Physical Volume Management Commands

Command	Description
<code>pvcreate</code>	Initialize a disk or partition for use as a physical volume
<code>pvs</code>	Scan all disks for pvs
<code>pvdisplay</code> , <code>pvs</code>	Display information about pvs
<code>pvresize</code>	resize a physical volume
<code>pvmove</code>	Move extents from one physical volume to another
<code>pvck</code>	Check metadata on pvs
<code>pvremove</code>	Remove LVM label(s) from pvs
<code>pvchange</code>	Change attributes of physical volumes

## Logical Volume Management Commands

Command	Description
<code>lvcreate</code>	Create a logical volume
<code>lvscan</code>	Scan (all disks) for lvs
<code>lvdisplay</code> , <code>lvs</code>	Display info about lvs
<code>lvextend</code>	Extend size of a lv
<code>lvremove</code>	Remove a logical volume
<code>lvrename</code>	Rename a logical volume
<code>lvchange</code>	Change attributes of a lv
<code>lvreduce</code> , <code>lvresize</code>	Reduce and resize the size of a logical volume
<code>lvconvert</code>	Convert a logical volume from linear to mirrored

## Examples

### Create Physical Volumes

```
$ sudo pvcreate /dev/vda1 /dev/vda2 /dev/vda3 /dev/vda4 /dev/vda5
```

### Create Volume groups

```
$ sudo vgcreate vg_system /dev/vda1 /dev/vda2
$ sudo vgcreate vg_others /dev/vda3 /dev/vda4 /dev/vda5
```

### Create Logical Volumes

```
$ sudo lvcreate -L 20GB -n lv_home vg_system
$ sudo lvcreate -L 35GB -n lv_root vg_system
$ sudo lvcreate -L 70GB -n lv_backups vg_others
```