GETTING STARTED

WITH

LOGICAL VOLUME MANAGEMENT

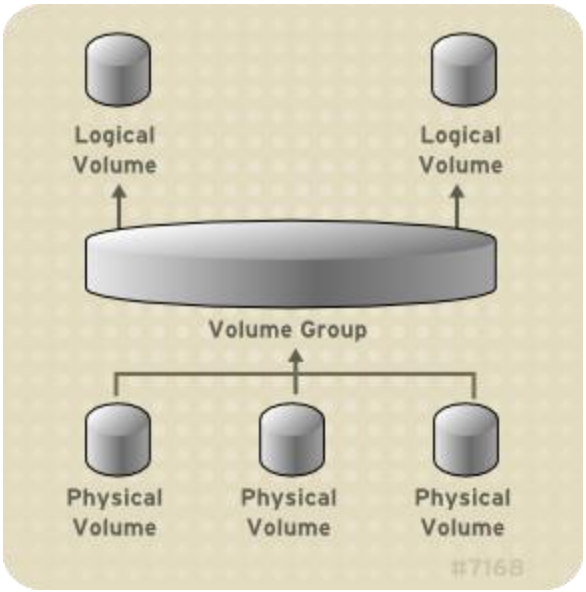
➢ LOGICAL VOLUME MANAGEMENT (LVM):

- LVM is a form advanced partition management.
- LVM is a method of allocating hard drive space in to logical volumes that can be **easily resized of partitions.**
- It creates a layer of abstraction over physical storage, which helps you to create logical storage volumes. This provides much greater flexibility in a number of ways than using physical storage directly.

ADVANTAGES OF LVM:

- Flexible capacity
- Convenient device naming
- Resizable storage volumes
- Online data relocation
- Striped Volumes
- RAID volumes
- Volume snapshots
- Cache volumes

LVM ARCHITECTURE:



PHYSICAL VOLUME (PV):

- **A PV** is a partition or whole disk designated for LVM use. To use the device for an LVM logical volume, the device must be initialized as a pv.

VOLUME GROUP (VG):

- A VG is a collection of physical volumes (PVs), which creates a pool of disk space out of which logical volumes can be allocated.
- Within a volume group, the disk space available for allocation is divided into units of a fixed-size called extents.
- An extent is the smallest unit of space that can be allocated. Within a physical volume, extents are referred to as physical extents.

LOGICAL VOLUME (LV):

- A logical volume represents a mountable storage device.
- An administrator can grow or shrink logical volumes without destroying data, unlike standard disk partitions.
- You can lose data if you shrink a logical volume to a smaller capacity than the data on the volume requires.
- Logical partitions which can resize, format and mount…etc.

LVM CONFIGURATION FILES:

/etc/lvm/lvm.conf **:** Configuration file.

/etc/lvm/cache/.cache **:** Device name filter cache file (configurable).

/etc/lvm/backup/ **:** Automatic volume group metadata backups.

/etc/lvm/archive/ **:** Automatic volume group metadata archives.

LVM IMPLEMENTATION STEP BY STEP:

- Create physical volume or volumes from the existing hard drives:

  Here we are creating three partitions **[/dev/nvme0n1p{11,12,13}.**

  #fdisk /dev/nvmeon1

  change Linux system type to Linux lvm.

  #partprobe /dev/nvme0n1

  #lsblk

CREATING PHYSICAL VOLUMES:

#pvcreate /dev/nvme0n1p{11,12,13}

→ **To verify the physical volumes:**

#pvdisplay or #pvs

→ **To scanning physical devices:**

#pvscan

CREATING VOLUME GROUP:

#vgcreate india /dev/nvmeon1p{11,12}

→ **To verify volume group details:**

#vgdisplay india (or) #vgs

→ **Scanning disks for volume groups:**

#vgscan

##

NOTE: By default, one **physical extend (PE)** size is 4MB.

To change **physical extend (PE) size:**

#vgcreate **-s 8** india /dev/nvme0n1p{11,12}

##

→ **To Extend existing volume group:**

#vgextend india /dev/nvme0n1p13

#vgdisplay

→ **To reducing Volume Group:**

#vgreduce india /dev/nvme0n1p13

CREATING LOGICAL VOLUMES:

→ **Hare logical volume size is 2G from the group of India.**

#lvcreate -L+2G -n /dev/india/ap

→ **To verify Logical volume details:**

#lvdisplay /dev/india/ap (or) #lvs

→ **Now to verify Volume group details:**

#vhdisplay

→ **Format logical volume:**

#mkfs.xfs -f /dev/india/ap

→ **Mounting File system:**

#mkdir /lvm-data

#mount /dev/india/ap /lvm-data

#df -h

→ **To make file system permanent in /etc/fstab file:**

/dev/india/ap /lvm-data xfs defaults 0 0

#systemctl daemon-reload

#mount /lvm-data

#df -h

EXTEND A LOGICAL VOLUME:

We have seen how to create a logical volume from scratch, but in most cases, you will need to increase the size of an already existing logical volume so it can accommodate more data.

→ **To extend 1GB size to /dev/india/ap file system:**

#lvextend -L+1G /dev/india/ap

#lvdisplay

#vgdisplay

→ **One last step is to resize the filesystem:**

#df -h

#xfs_growfs /dev/india/ap

#df -h

we can see that data blocks have been changed; filesystem has been extended.

REDUCING LOGICAL VOLUME SIZE:

#lvreduce -L-1G /dev/india/ap

#lvdisplay

REMOVING LOGICAL VOLUMES:

NOTE: Before removing unmount a file system

#lvremove /dev/india/ap

#lvdiplay

REMOVING VOLUME GROUP:

#vgremove india

#vgdisplay

REMOVING PHYSICAL VOLUMES:

#pvremove /dev/nvme0n1p{11,12,13}

#pvdiplay

NOTE: All done, our Logical Volume has been successfully completed!