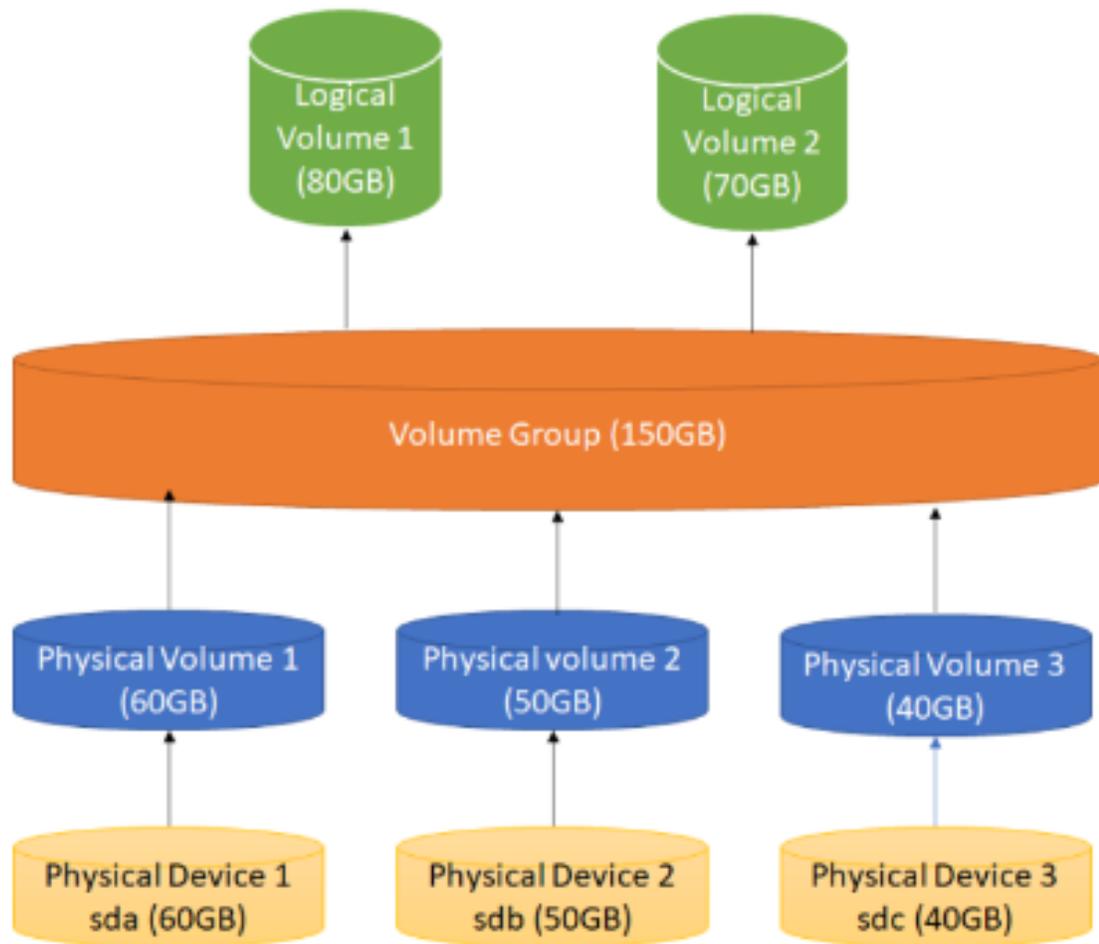# FHS & LVM in LINUX

Logical Volume Management (solution)

- We convert the physical disks into Physical Volumes (PV) of the same sizes,

- Combine them to form one Volume Group (VG) (60+50+40=150Gb) and finally, break this VG into two Logical Volumes (LV) of 80Gb and 70Gb.

Logical Volume 1 (80GB)	Logical Volume 2 (70GB)
Volume Group (150GB)	
Physical Volume 1 (60GB)	Physical volume 2 (50GB)	Physical Volume 3 (40GB)
Physical Device 1 sda (60GB)	Physical Device 2 sdb (50GB)	Physical Device 3 sdc (40GB)

4. Create Logical Volume (LV)

3. Create Volume Group (VG)

2. Create Physical Volume (PV)

1. Physical Storage – disk partitions or full disk or RAID

Steps to create LVG in Linux

pv... => Physical Volumes commands
vg... => Volume Group commands
lv... => Logical Volumes commands
lvm... => Genetal LVM commands

- **How to create an LVM Logical Volume:**

1. Create physical volume or volumes from the existing hard drives.

2. Create a Volume group and add the physical volumes to it.

3. Create a Logical Volume from the Volume Group.

4. Format the Logical Volume as required — xfs, ext4 etc.

5. Finally, mount the new filesystem.

-

CREATION

1)**gdisk/fdisk [device]** and create as many partitions as needed
  (don't forget the type to be "Linux LVM"

2)Label your new partitions as PV **pvcreate partition1 partition2 ...** or go straight to create a VG.

3)Create a Volume Group with **vgcreate name partition1,2,3...**

4)Create Logical Volumes with **lvcreate -n name -l/L size vgname**

5)**mkfs -t type lvname** your new LVs

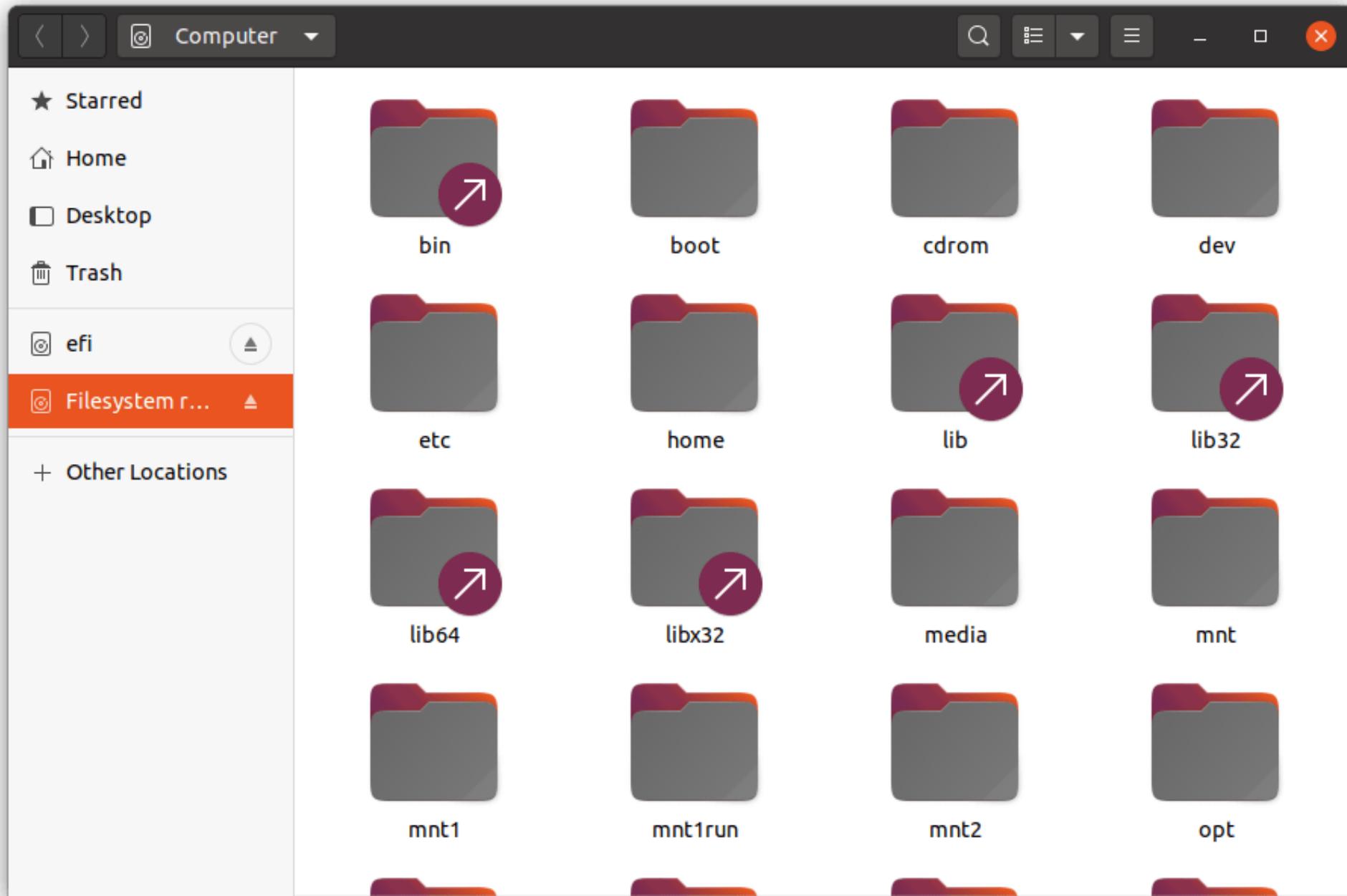6)**mount /fstab** !

DELETION
    lv/vg/pvremove

Logical Volume Management in Linux

- Method to manage disk space.
- ***For example***:
  1. you have three disks: 60Gb, 50Gb and 40Gb
  2. you want to allocate 80Gb and 70Gb of space to two users U1 and U2 respectively.
  3. problem, there is no single unit of either size available.
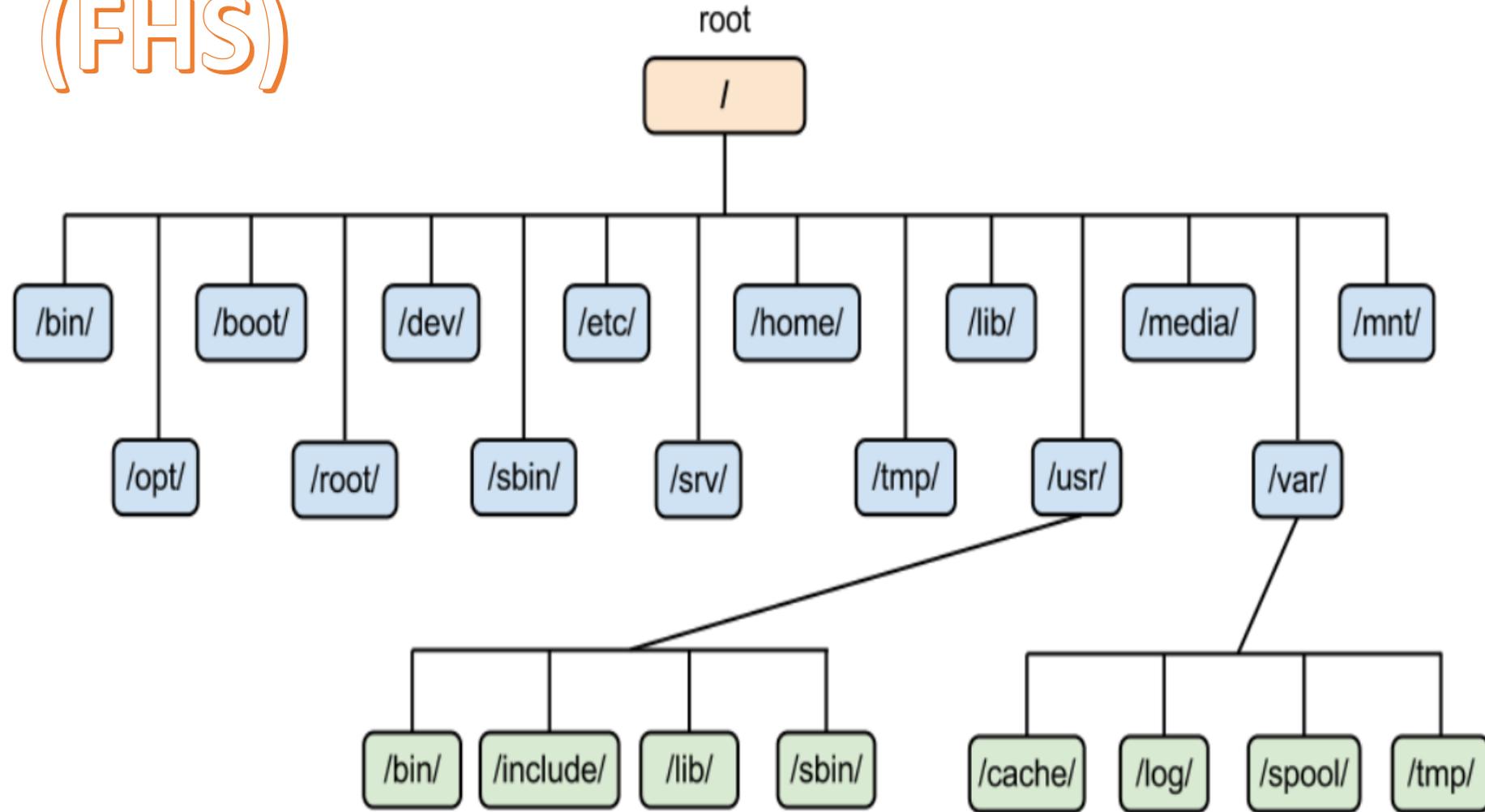 4. Solution, Logical Volume Management.

File system Hierarchy Standard (FHS)

File system Hierarchy Standard (FHS)

- The Linux filesystem is the foundation of any Linux-based operating system. It dictates how files are stored, organized, and accessed. Understanding this system is crucial for any DevOps engineer, as it influences everything from system performance to security and deployment processes

Starred

Home

Desktop

Trash

efi

Filesystem r...

Other Locations

bin

boot

cdrom

dev

etc

home

lib

lib32

lib64

libx32

media

mnt

mnt1

mnt1run

mnt2

opt

File system Hierarchy Standard (FHS)

Notice that the topmost directory in the structure is the / directory, also called the
root directory.

- Beneath the root directory are a series of subdirectories.   Specifications for how these directories are to be named are contained in the File system Hierarchy Standard (FHS)

/bin

- Bin or binary.

- This directory contains executable files ملفات تنفيذية necessary to manage and run the Linux system, including shells (such as bash) and file system management utilities such as cp and rm.

- يحتوي علي ملفات تنفيذية او برامج يحتاجها النظام بشكل اساسي في ال single user mode

- ده mode ادخل عليه لما عاوز اعمل upgarde او اعمل تصليحات في النظام

/sbin

- System binary or Sbin for administrators
- This directory contains important system management and administration files,

 such as fdisk, fsck, ifconfig, init, mkfs, shutdown, and halt.

/lib

- This directory contains code libraries used by programs in /bin and /sbin. Your kernel modules are also stored in the modules subdirectory of /lib.

/boot

- This directory contains your bootloader files, which are required to boot your kernel Linux system.

/dev

- Devices or dev
- This directory contains special files that are get kernel to interact with devices or hardware
- Solid state drives: (SCSI)
- Such as sda ,(sda1,sda2 is the partitions for it), Sdb,sdc,……..
- Hard disk drives (IDE or SATA):
- Had, hdb, hdc,…………

==/etc==

- This directory contains text-based configuration files used by the system as well as services running on the system. You can edit these files with a text editor to ==customize== how Linux behaves as (apt used to install new packages).

- تحتوي علي ملفات الاعدادت التي تطبق علي كل مستخدمي توزيعة

/home

- This directory contains subdirectories that serve
→as home directories for each user account on your Linux system.

→Each home user contains files as (desktop, download, music, picture, public, templets,….)

/media

- This directory is used by some Linux distributions (such as SUSE Linux) to mount external devices.

/mnt

- This directory is used by some Linux distributions (such as Fedora or Red Hat) to mount external devices

/opt

- optional
- This directory contains files for some programs you install on the system
- Store files to install optional packages in the server.

/proc

- Contains sudo folders which represents the number of process in the kernel each file contains all information about the process.
- volatile
- ملفات غير حقيقية
- و غير مكتوبة بشكل فعلي و لكنها تحتوي علي مجموعه ملفات بها ارقام هذه الارقام عبارة عن ال

process number (رقم العملية الي شغال علي الجهاز)

/srv

Contain service information

- This directory contains subdirectories where services running on the system (such as ftp ssh   for web server) save their files.

/sys

- This system directory contains information about the hardware in your system

- Volatile, store its contents in RAM and once shutdown the computer all contents of /sys are deleted.

/tmp

- This directory contains temporary files created by you or by the system.

/usr

- This directory contains programs or application files. In fact, most of the application files used on your system are saved in a subdirectory of /usr.

/var

- Variables

- تحتوي علي الملفات التي حجمها تتغير مع الوقت log files

- This directory contains a variety of variable data, including your system

- log files for programs

- Spool files for printers

- Mail box

- www files for webserver