

Device files Volume Manager

Device Files

- See
 - `$ ls -l /dev`
 - “c” character special device files
 - ‘b’ block device files
- Device file represents a hardware device
- `Open()` and then `read()`, `write()` on device files will read/write from the device (if supported)

Device Files

- Major Number and Minor Number
 - The size field in inode is reused as major-minor number field for device files
 - Major number: type of device (identifies the device driver)
 - Minor number: device number of that type (tells the device driver, which device)
- Xv6
 - The `sys_read()->file_read()->readi()` will redirect the read operation to
`return devsw[ip->major].read(ip, dst, n);`
where

```
struct devsw {  
    int (*read)(struct inode*, char*, int);  
    int (*write)(struct inode*, char*, int);  
};
```

Block Device Files

- For “block” devices
 - read() ,write() happen in multiples of “block”
- E.g.
 - */dev/sda1*
 - */dev/hda1*
 - */dev/nvme01*

Issues with disk partitions

- Use of disk partitions

```
$ fdisk /dev/sdb # create partitions
```

```
$ mkfs -t ext2 /dev/sdb1 # format
```

```
$ mount -t ext2 /dev/sdb1 /a/b # mounted on /a/b
```

- Fixed size

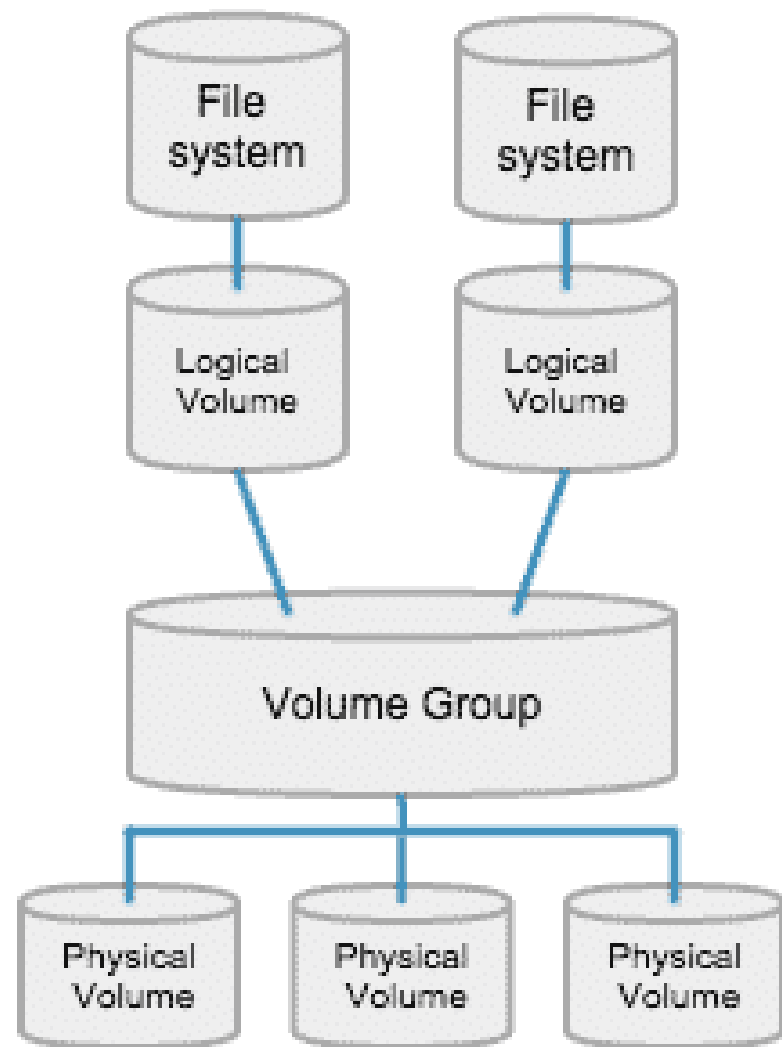
- Can't easily grow them

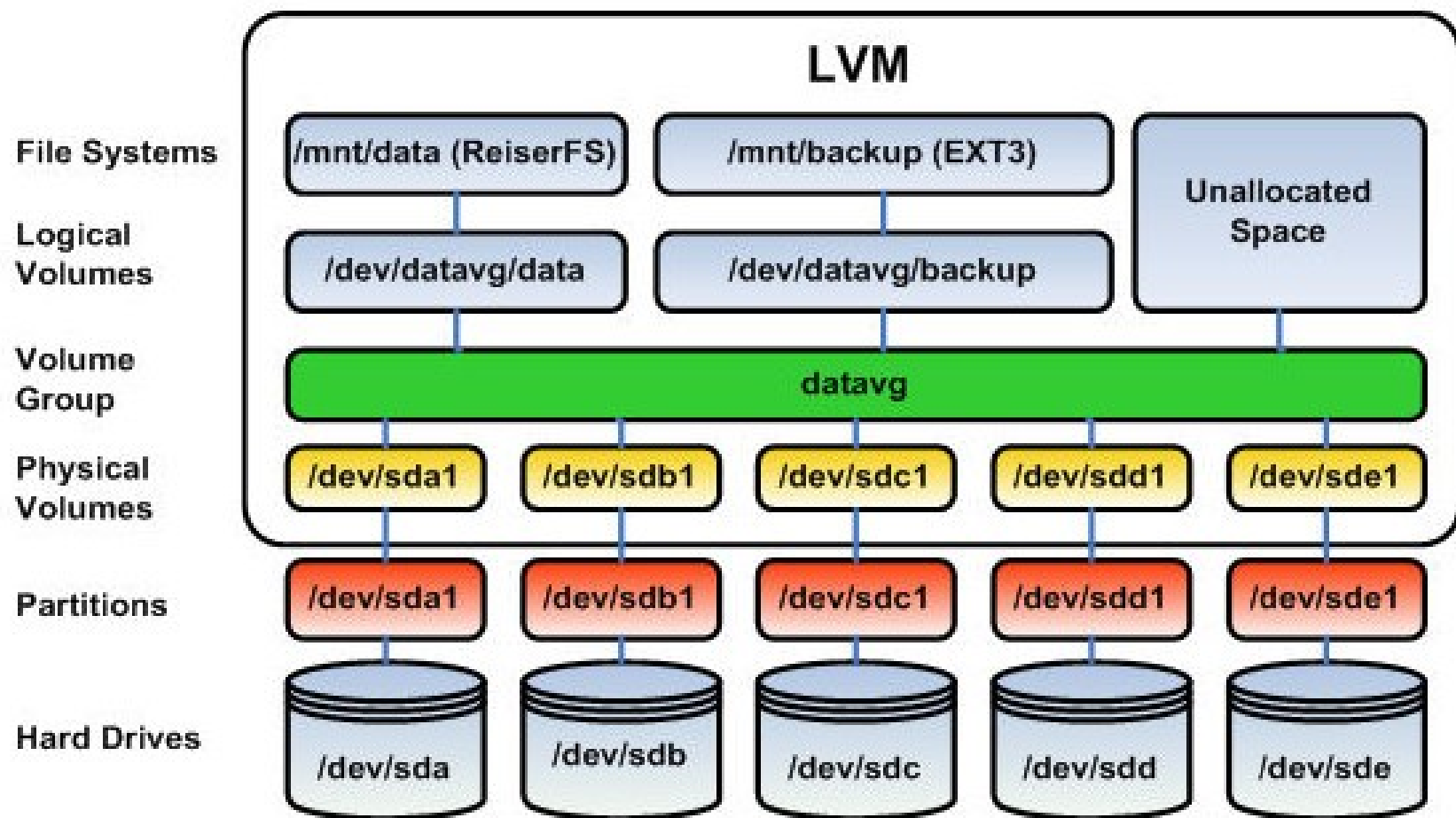
- Without risk of losing file system

- Can't easily shrink them

Logical Volume Manager (LVM)

- A layer (indirection) between physical partitions (physical volumes) and file system
 - Enables easy grouping , re-grouping, extending, shrinking, ...
- Logical Volume Group:
 - Parallel to a physical disk (but extendible)
- Logical Volume
 - Parallel to a physical partition (but extendible!)





LVM

File Systems
Sistema de arquivos

/home
(ext4)

/data
(xfs)

Logival Volume (LV)
Volume Lógico

/dev/vgroup/lv_home

/dev/vgroup/lv_data

Volume Groups (VG)
Grupos de volumes



vgroup

www.linuxnaweb.com

Physical Volumes (PV)
Volumes físicos

/dev/sdb1

/dev/sdb2

/dev/sdc1

/dev/sdc2

Partitions
Partições

/dev/sdb1
8e LVM

/dev/sdb2
8e LVM

/dev/sdc1
8e LVM

/dev/sdc2
8e LVM

Physical Drives
Drivers físicos



/dev/sdb



/dev/sdc