

-LVM USING MULTIPATH : LABS

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CREATE PHYSICAL PARTITIONS

- add two virtual hard drive of 10 GiB to VM
- use fdisk to partition the disks

```
$ sudo fdisk /dev/sdb
```

```
n
```

```
p
```

```
2
```

```
t
```

```
8e
```

```
p
```

```
w
```

- do the same thing for the sdc

- ensure that partitioning work as expected

```
$ lsblk
```

SETUP MULTIPATH

- Install Multipath Tools

```
$ sudo dnf install device-mapper-multipath
```

- Configure Multipath

```
$ sudo mpathconf --enable --with_multipathd y
```

- since we using only one path for each device we have to edit the configuration to detect our disks so we modify **/etc/multipath.conf** file and in the defaults set the find_multipaths to no:

```
defaults {  
    user_friendly_names yes  
    find_multipaths no  
}
```



- **Start and enable Multipath daemon**

```
$ sudo systemctl enable multipathd
```

```
$ sudo systemctl start multipathd
```

- **Check Multipath device**

```
$ sudo multipath -v3
```

- **Ensure that the multipath device created**

```
$ sudo multipath -ll
```

```
$ ls /dev/mapper
```

you should see **mpatha** and **mpathb** in the output

CREATE LOGICAL PARTITIONS

- **Create Physical Volume**

create some physical volume using the multipath we just created

```
$ sudo pvcreate /dev/mapper/mpatha2
```

```
$ sudo pvcreate /dev/mapper/mpathb2
```

- **Ensure Physical Volume created**

```
$ sudo pvs
```

- **Create Volume Group**

- ```
$ sudo vgcreate Erfan /dev/mapper/mpatha /dev/mapper/mpathb
```

- **Ensure Volume Group created**

```
$ sudo vgs
```

- **Create Logical Volumes on erfan Volume Group**

```
$ sudo lvcreate -n monitoring -L 4G erfan
```

```
$ sudo lvcreate -n database -L 7G erfan
```

```
$ sudo lvcreate -n backup -l 100%FREE erfan
```

- **Ensure Logical Volume created**

```
$ sudo lvs
```

```
$ ls /dev/erfan/
```

you should see **backup**, **database** and **monitoring** in the output

- **Now you can format use mkfs, then mount and use this partition**



## **LAB-1, 2: ADD SPACE TO LV BACKUP, MONITORING**

- **Add 3 GiB to monitoring**

```
$ sudo lvextend -L+3G /dev/erfan/monitoring
```

- **Add 2 GiB to database**

```
$ sudo lvextend -l +100%FREE /dev/erfan/database
```

- **resize the file system**

```
$ sudo resize2fs /dev/erfan/monitoring
```

```
$ sudo resize2fs /dev/erfan/database
```



# LVM-HOMEWORKS

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## 1-A) ADD PV /DEV/SDB1 TO ERFAN VG AGAIN

- Use the **\$ sudo multipath -v3** to scan and add the new partition to multipath

- Create another physical volume

```
$ sudo pvcreate /dev/mapper/mpathdb
```

- Extend the Volume Group

```
$ sudo vgextend erfan /dev/mapper/mpathdb
```

## 1-B) REDUCE 3GIB FROM LV BACKUP

- umount the backup

```
$ sudo umount /dev/erfan/backup
```

- Reduce the Logical Volume

```
$ sudo resize2fs /dev/erfan/backup 3000M
```

```
$ sudo lvreduce -L 7GB /dev/erfan/backup
```

```
$ sudo resize2fs /dev/erfan/backup
```

- remount backup

```
$ sudo mount /dev/erfan/backup /backup
```

## 1-C) ADD 7GIB TO LV DATABASE

- umount the database

```
$ sudo umount /dev/erfan/database
```

- extend the Logical Volume

```
$ sudo lvextend -L+7G /dev/erfan/database
```

```
$ sudo resize2fs /dev/erfan/backup
```

- remount database

```
$ sudo mount /dev/erfan/database
```



## 2) WHAT IS SNAPSHOT ON LVM?

A snapshot in LVM is a point-in-time copy of a logical volume. It captures the state of a logical volume at a specific moment, which can be useful for backups or recovery without affecting the original data.

## 3) CREATE LVM SNAPSHOT AND RESTORE IT

- Create a new Snapshot, the size of the snapshot must be available in vg

```
$ sudo lvcreate -L 1G -s -n monitoring_snapshot /dev/erfan/monitoring
```

You can see the snapshot detail using `lvs` command

- restore the snapshot after changes

```
$ sudo lvconvert --merge /dev/erfan/monitoring_snapshot
```

- reactive the logical volume

```
$ sudo lvchange -ay /dev/erfan/monitoring
```

```
root@localhost-live:/home/liveuser# sudo lvcreate -L 1G -s -n monitoring_snapshot /dev/erfan/monitoring
Logical volume "monitoring_snapshot" created.
root@localhost-live:/home/liveuser# lvs
LV VG Attr LSize Pool Origin Data% Meta% Move Log Cpy%Sync Convert
backup erfan -wi-a----- 6.99g
database erfan -wi-a----- 7.00g
monitoring erfan owi-a-s--- 4.00g
monitoring_snapshot erfan swi-a-s--- 1.00g monitoring 0.00
root@localhost-live:/home/liveuser# lvconvert --merge /dev/erfan/monitoring_snapshot
Merging of volume erfan/monitoring_snapshot started.
erfan/monitoring: Merged: 100.00%
```



## 5) NAME AND DEFINE LV STATUSES

- **Active:**

The logical volume is available and can be accessed or mounted

- **Inactive:**

The logical volume is not currently available

- **Suspended:**

The logical volume is temporarily frozen and cannot be accessed

- **Snapshot:**

Indicates that the logical volume is a snapshot volume

- **Merging:**

When a snapshot is being merged back into the original logical volume

- **Merging Failed:**

If there is an error during the merging process

- **Thin Volume:**

Physical storage is only allocated as data is written, up to a specified maximum size

- **Thin Pool:**

A thin pool provides the underlying physical storage for multiple thin volumes, and its status reflects the health of the pool

- **Read-Only:**

The logical volume is in a read-only state, meaning no write operations can occur

- **Error:**

Indicates that the logical volume is in an error state due to an underlying issue, such as physical volume failure or corruption

## 6) HOW CAN SPREAD DATA ON LVM ON TWO HARD DISK JUST LIKE RAID 0?

- **Create a Striped Logical Volume**

```
$ sudo lvcreate -L 10G -i 2 -l 128 -n striped_lv erfan
```

