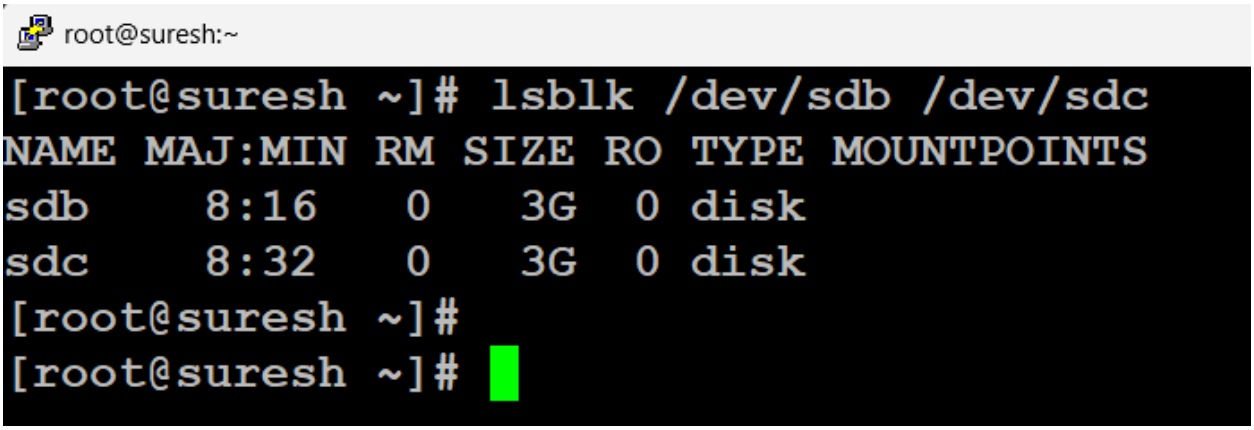
RAID 0:

Configuring a RAID 0 (striped) array using mdadm:

- **Prerequisites:**
  - At least **2 unused disks or partitions**, e.g. **/dev/sdb** and **/dev/sdc**.
  - **Back up any important data**—this process will erase the selected devices.

Step 1: Add New disks and verify the disks

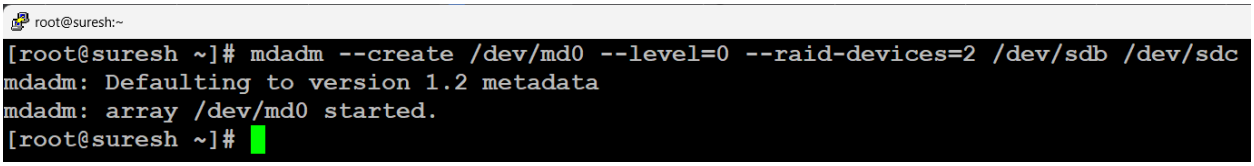
Command: lsblk



Step 2: Create the RAID 0 Array using Mdadm

Command:

mdadm --create /dev/md0 --level=0 --raid-devices=2 /dev/sdb /dev/sdc



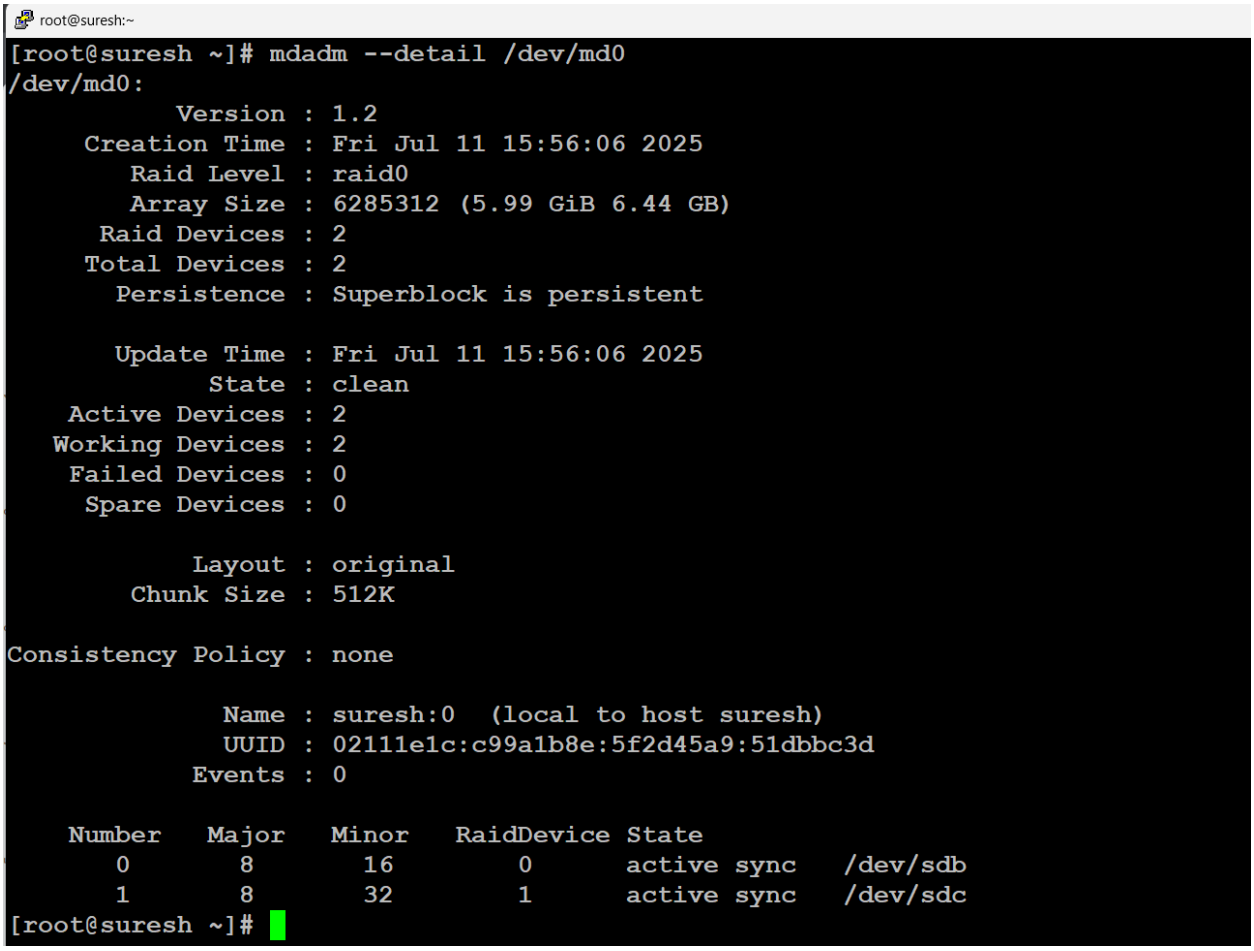
- **--level=0: stripe across disks for speed**
- **--raid-devices=2: number of disks**
- **/dev/md0: name of new virtual RAID device**

Step 3: Verify the RAID Is Created

Commands:

mdadm --detail /dev/md0

cat /proc/mdstat



```
root@suresh:~
[root@suresh ~]# cat /proc/mdstat
Personalities : [raid0]
md0 : active raid0 sdc[1] sdb[0]
      6285312 blocks super 1.2 512k chunks

unused devices: <none>
[root@suresh ~]#
```

- **mdadm --detail shows configuration, component status, and health.**
- **cat /proc/mdstat shows live sync/build progress**

Step 4: Assign File System & Mount

Command:

mkfs.xfs /dev/md0

```
root@suresh:~
[root@suresh ~]# mkfs.xfs /dev/md0
log stripe unit (524288 bytes) is too large (maximum is 256KiB)
log stripe unit adjusted to 32KiB
meta-data=/dev/md0               isize=512    agcount=8, agsize=196480 blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=1, sparse=1, rmapbt=0
         =                       reflink=1    bigtime=1 inobtcount=1 nrext64=0
data     =                       bsize=4096   blocks=1571328, imaxpct=25
         =                       sunit=128    swidth=256 blks
naming   =version 2              bsize=4096   ascii-ci=0, ftype=1
log      =internal log           bsize=4096   blocks=16384, version=2
         =                       sectsz=512   sunit=8 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
[root@suresh ~]#
[root@suresh ~]# blkid /dev/md0
/dev/md0: UUID="ecd9bf2c-eb8a-4578-913e-5e910d90df7c" TYPE="xfs"
[root@suresh ~]#
```

Commands:

mkdir /md0

mount /dev/md0 /md0

df -h /md0

```
root@suresh:~
[root@suresh ~]# mkdir /md0
[root@suresh ~]# mount /dev/md0 /md0
[root@suresh ~]# df -h /md0
Filesystem      Size  Used Avail Use% Mounted on
/dev/md0        6.0G   75M  5.9G   2% /md0
[root@suresh ~]#
```

Step 5: Persist the mount in /etc/fstab

Commands:

vi /etc/fstab

cat /etc/fstab | grep -i /md0

mount | grep /md0

```
root@suresh:~
[root@suresh ~]# vi /etc/fstab
[root@suresh ~]# cat /etc/fstab | grep -i /md0
UUID=ecd9bf2c-eb8a-4578-913e-5e910d90df7c       /md0    xfs     defaults        0 0
[root@suresh ~]# mount | grep /md0
/dev/md0 on /md0 type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,sunit=1024,swidth=2048,noquota)
[root@suresh ~]#
```

```
root@suresh:~
[root@suresh ~]# lsblk /dev/sdb /dev/sdc
NAME   MAJ:MIN RM SIZE RO TYPE  MOUNTPOINTS
sdb      8:16   0   3G  0 disk
└─md0    9:0    0   6G  0 raid0 /md0
sdc      8:32   0   3G  0 disk
└─md0    9:0    0   6G  0 raid0 /md0
[root@suresh ~]#
```

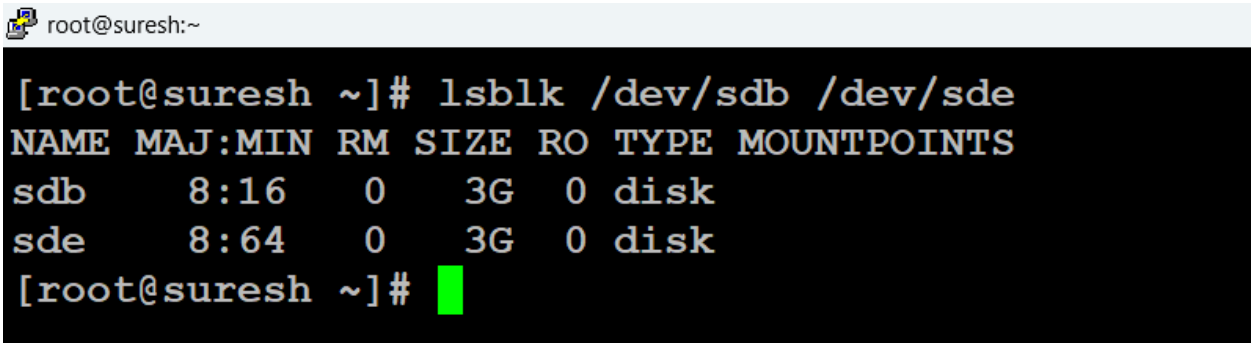
RAID 1:

Configuring a RAID 1 (mirrored) array using mdadm:

- **Prerequisites:**
  - At least **2 unused disks or partitions** of identical size (e.g., /dev/sdd, /dev/sde).
  - **Back up important data**—this process erases the selected devices.

Step 1: Add New disks and verify the disks

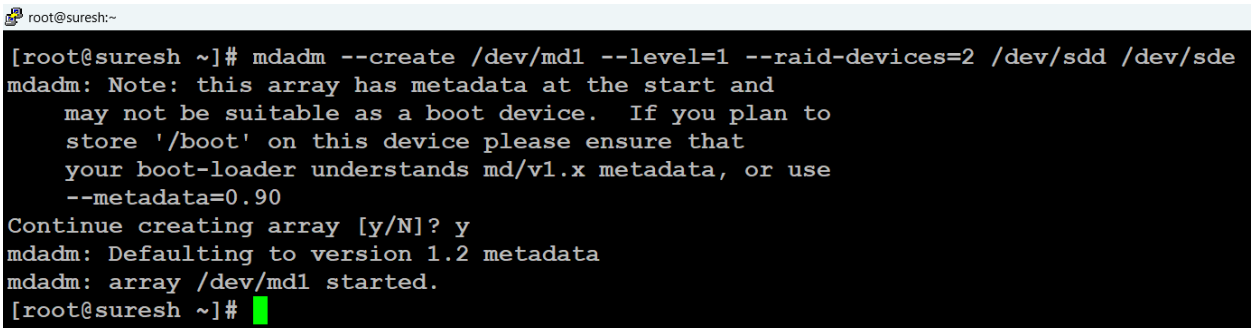
Command: lsblk



Step 2: Create the RAID 1 Array using Mdadm

Command:

mdadm --create /dev/md1 --level=1 --raid-devices=2 /dev/sdd /dev/sde



NOTE:

By default, mdadm uses metadata version 1.2, which writes RAID information (called a *superblock*) at the beginning of the array—before any user data.

If you plan to put /boot (or anything boot-critical) on this RAID, use metadata version 0.90, which places metadata at the end of the array—keeping the start clean for your bootloader.

Command:

mdadm --create /dev/md1 --level=1 --raid-devices=2 --metadata=0.90 /dev/sdd /dev/sde

- **--level=1 = sets mirroring (RAID 1).**
- **--raid-devices=2 = uses 2 disks.**
- **/dev/md1 = name of the RAID device.**

Step 3: Verify the RAID Is Created

Commands:

mdadm --detail /dev/md1

cat /proc/mdstat

root@suresh:~

```
[root@suresh ~]# mdadm --detail /dev/md1
/dev/md1:
           Version : 1.2
     Creation Time : Fri Jul 11 17:17:15 2025
        Raid Level : raid1
        Array Size : 3142656 (3.00 GiB 3.22 GB)
     Used Dev Size : 3142656 (3.00 GiB 3.22 GB)
      Raid Devices : 2
     Total Devices : 2
       Persistence : Superblock is persistent

       Update Time : Fri Jul 11 17:17:31 2025
             State : clean
    Active Devices : 2
   Working Devices : 2
    Failed Devices : 0
     Spare Devices : 0

Consistency Policy : resync

              Name : suresh:1  (local to host suresh)
              UUID : 7fe5845c:3c8266d9:6148579e:371e2182
            Events : 17

    Number   Major   Minor   RaidDevice State
       0       8       48        0      active sync   /dev/sdd
       1       8       64        1      active sync   /dev/sde
[root@suresh ~]#
```

root@suresh:~

```
[root@suresh ~]# cat /proc/mdstat
Personalities : [raid0] [raid1]
md1 : active raid1 sde[1] sdd[0]
      3142656 blocks super 1.2 [2/2] [UU]

unused devices: <none>
[root@suresh ~]#
```

Step 4: Assign File System & Mount

Command:

mkfs.xfs /dev/md1

```
root@suresh:~
[root@suresh ~]# mkfs.xfs /dev/md1
meta-data=/dev/md1               isize=512    agcount=4, agsize=196416 blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=1, sparse=1, rmapbt=0
         =                       reflink=1    bigtime=1 inobtcount=1 nrext64=0
data     =                       bsize=4096   blocks=785664, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0, ftype=1
log      =internal log           bsize=4096   blocks=16384, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
[root@suresh ~]#
[root@suresh ~]# blkid /dev/md1
/dev/md1: UUID="487b9682-1f2f-42b7-a8c7-c570f81018af" TYPE="xfs"
[root@suresh ~]#
```

Commands:

mkdir /md1

mount /dev/md1 /md1

df -h /md1

```
root@suresh:~
[root@suresh ~]# mkdir /md1
[root@suresh ~]# mount /dev/md1 /md1
[root@suresh ~]# df -h /md1
Filesystem      Size  Used Avail Use% Mounted on
/dev/md1        3.0G   54M  2.9G   2% /md1
[root@suresh ~]#
```

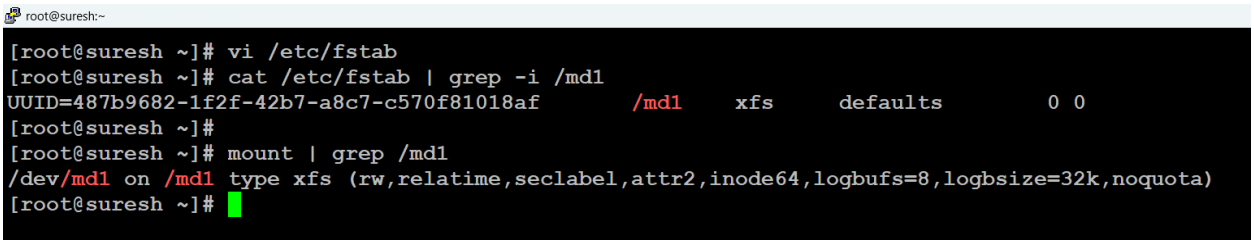
Step 5: Persist the mount in /etc/fstab

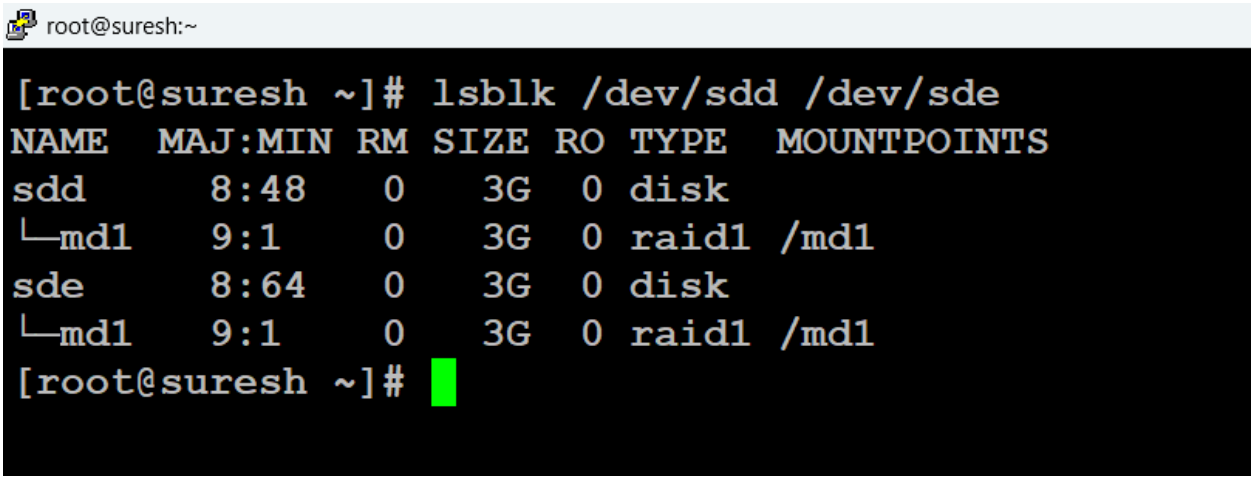
Commands:

vi /etc/fstab

cat /etc/fstab | grep -i /md1

mount | grep /md1





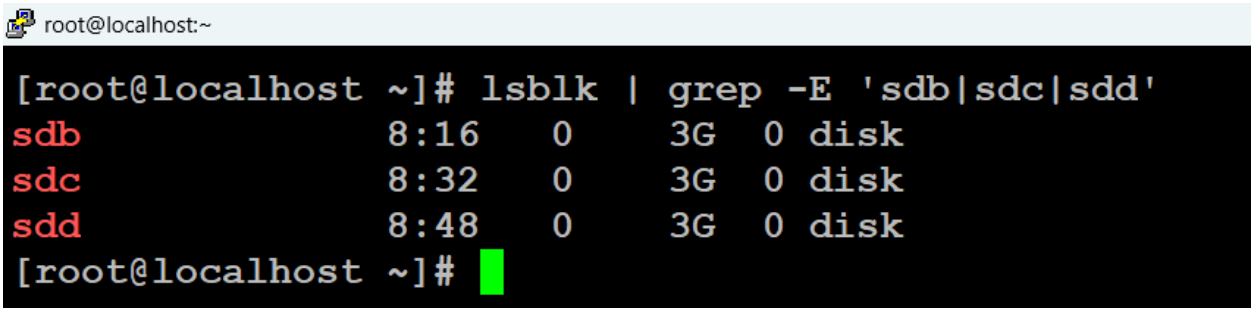
RAID 5:

Configuring a RAID 5 (striped with parity) array using mdadm:

- **Prerequisites**
  - **Minimum 3 same-size unused disks/partitions, e.g. /dev/sdb, /dev/sdc, /dev/sdd.**

Step 1: Add New disks and verify the disks

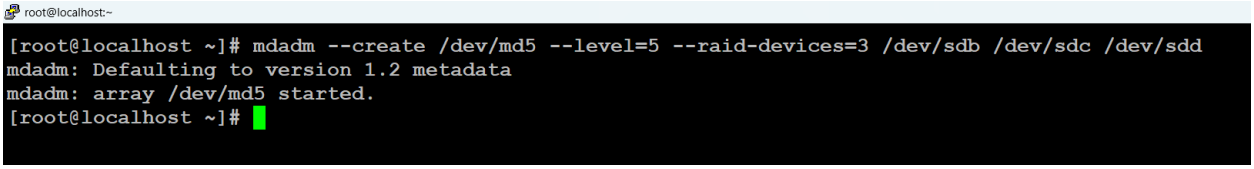
Command: lsblk | grep -E 'sdb|sdc|sdd'



Step 2: Create the RAID 5 Array using Mdadm

Command:

mdadm --create /dev/md5 --level=5 --raid-devices=3 /dev/sdb /dev/sdc /dev/sdd



- **--level=5 : RAID 5 (striping + parity)**

- **--raid-devices=3 : using 3 disks**

  (mdadm spins up the array and starts parity sync)

Step 3: Verify the RAID Is Created

Commands:

mdadm --detail /dev/md5

cat /proc/mdstat

root@localhost:~

```
[root@localhost ~]# mdadm --detail /dev/md5
/dev/md5:
           Version : 1.2
     Creation Time : Fri Jul 11 19:11:27 2025
        Raid Level : raid5
        Array Size : 6285312 (5.99 GiB 6.44 GB)
     Used Dev Size : 3142656 (3.00 GiB 3.22 GB)
      Raid Devices : 3
     Total Devices : 3
       Persistence : Superblock is persistent

       Update Time : Fri Jul 11 19:11:42 2025
             State : clean
    Active Devices : 3
   Working Devices : 3
    Failed Devices : 0
     Spare Devices : 0

            Layout : left-symmetric
        Chunk Size : 512K

Consistency Policy : resync

              Name : localhost.localdomain:5  (local to host localhost.localdomain)
              UUID : ed97c684:b3ae174b:e86ea7e2:2b0264f0
            Events : 18

    Number   Major   Minor   RaidDevice State
       0       8       16        0      active sync   /dev/sdb
       1       8       32        1      active sync   /dev/sdc
       3       8       48        2      active sync   /dev/sdd
```

root@localhost:~

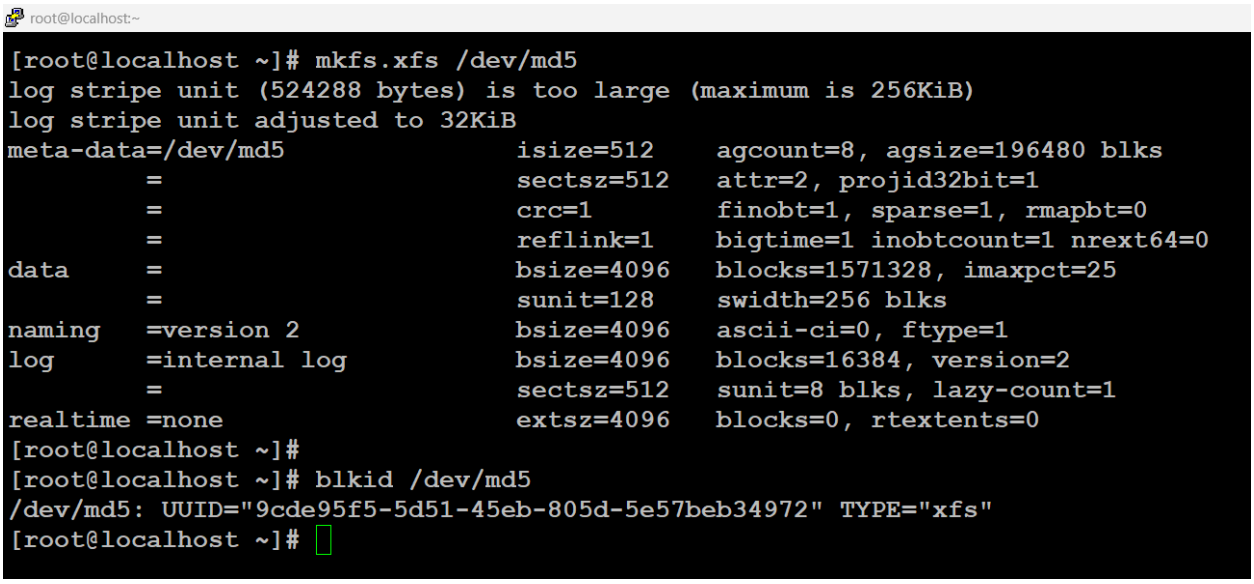
```
[root@localhost ~]# cat /proc/mdstat
Personalities : [raid6] [raid5] [raid4]
md5 : active raid5 sdd[3] sdc[1] sdb[0]
      6285312 blocks super 1.2 level 5, 512k chunk, algorithm 2 [3/3] [UUU]

unused devices: <none>
[root@localhost ~]#
```

Step 4: Assign File System & Mount

Command:

mkfs.xfs /dev/md5

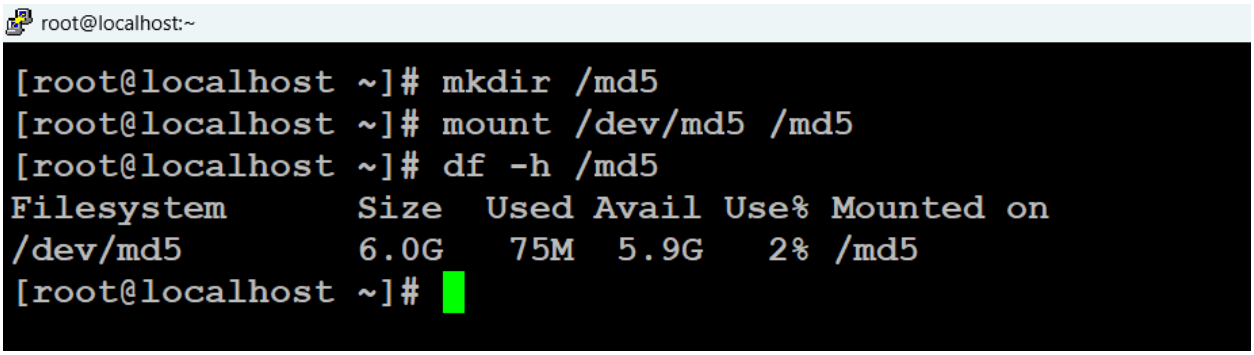


Commands:

mkdir /md5

mount /dev/md5 /md5

df -h /md5



Step 5: Persist the mount in /etc/fstab

Commands:

vi /etc/fstab

cat /etc/fstab | grep -i /md5

mount | grep /md5

root@localhost:~

```
[root@localhost ~]# vi /etc/fstab
[root@localhost ~]# cat /etc/fstab | grep -i /md5
/dev/md5        /md5    xfs     defaults        0 0
[root@localhost ~]#
[root@localhost ~]#
```

root@localhost:~

```
[root@localhost ~]# lsblk /dev/sd{b,c,d}
NAME  MAJ:MIN RM SIZE RO TYPE  MOUNTPOINTS
sdb     8:16   0   3G  0 disk
└─md5   9:5    0   6G  0 raid5 /md5
sdc     8:32   0   3G  0 disk
└─md5   9:5    0   6G  0 raid5 /md5
sdd     8:48   0   3G  0 disk
└─md5   9:5    0   6G  0 raid5 /md5
[root@localhost ~]#
```

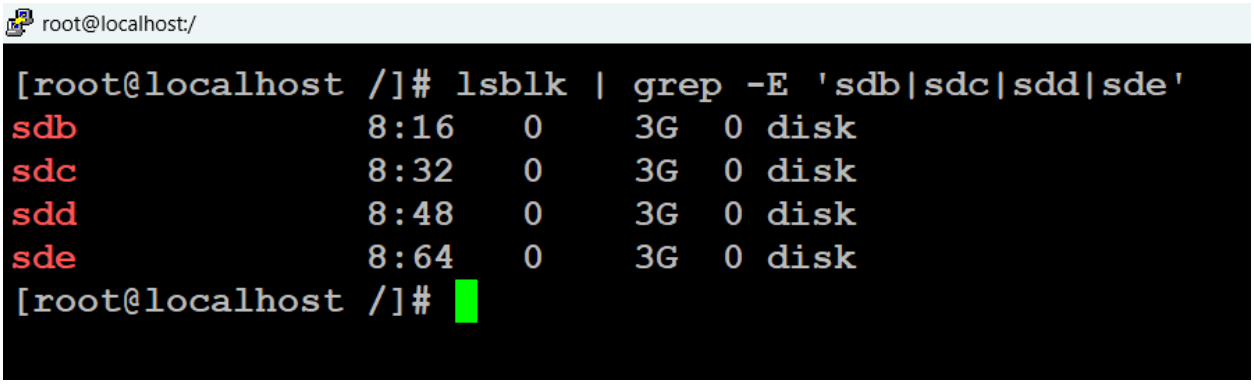
RAID 10:

Configuring a RAID 10 (Striped Mirrors) array using mdadm:

- **Prerequisites**
  - **Minimum 4 same-size unused disks/partitions, e.g. /dev/sdb, /dev/sdc, /dev/sdd, /dev/sde**

Step 1: Add New disks and verify the disks

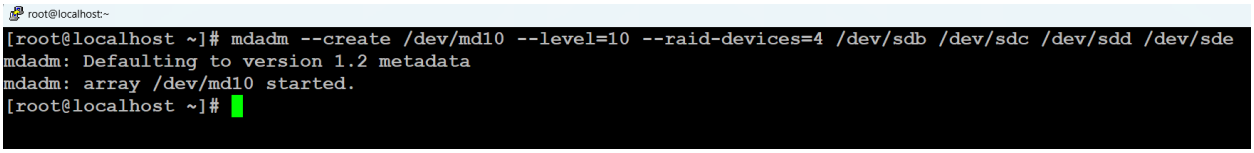
Command: lsblk | grep -E 'sdb|sdc|sdd|sde'



Step 2: Create the RAID 10 Array using Mdadm

Command:

mdadm --create /dev/md10 --level=10 --raid-devices=4 /dev/sdb /dev/sdc /dev/sdd /dev/sde



- **--level=10: sets up RAID 10 (striped mirrors).**
- **--raid-devices=4: specifies four disks.**

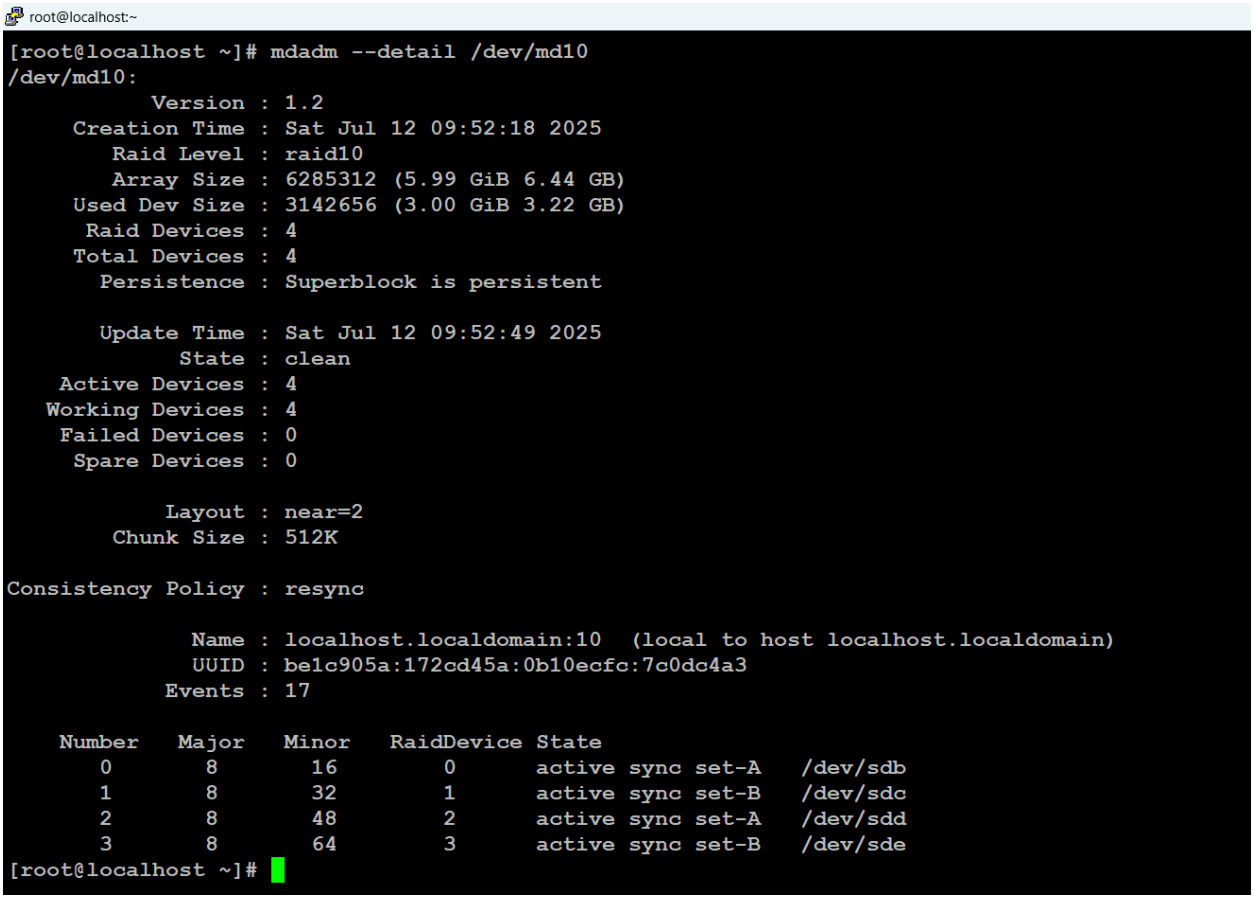
  RAID 10 combines mirroring and striping for both performance and redundancy

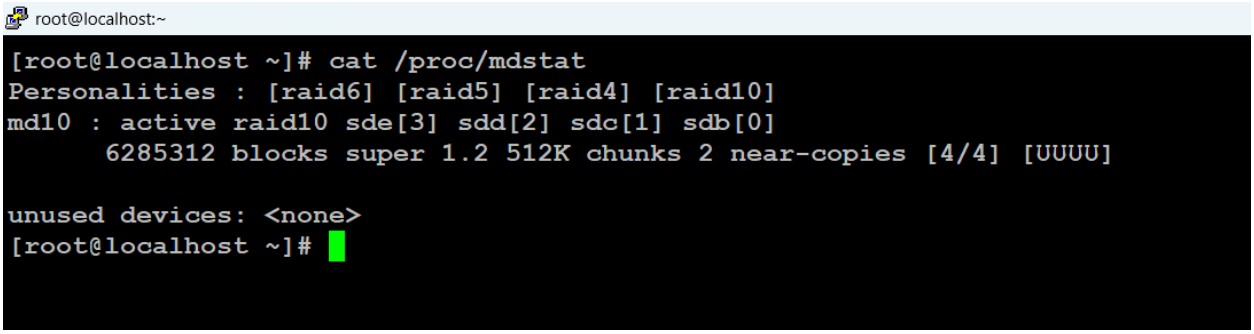
Step 3: Verify the RAID Is Created

Commands:

mdadm --detail /dev/md10

cat /proc/mdstat

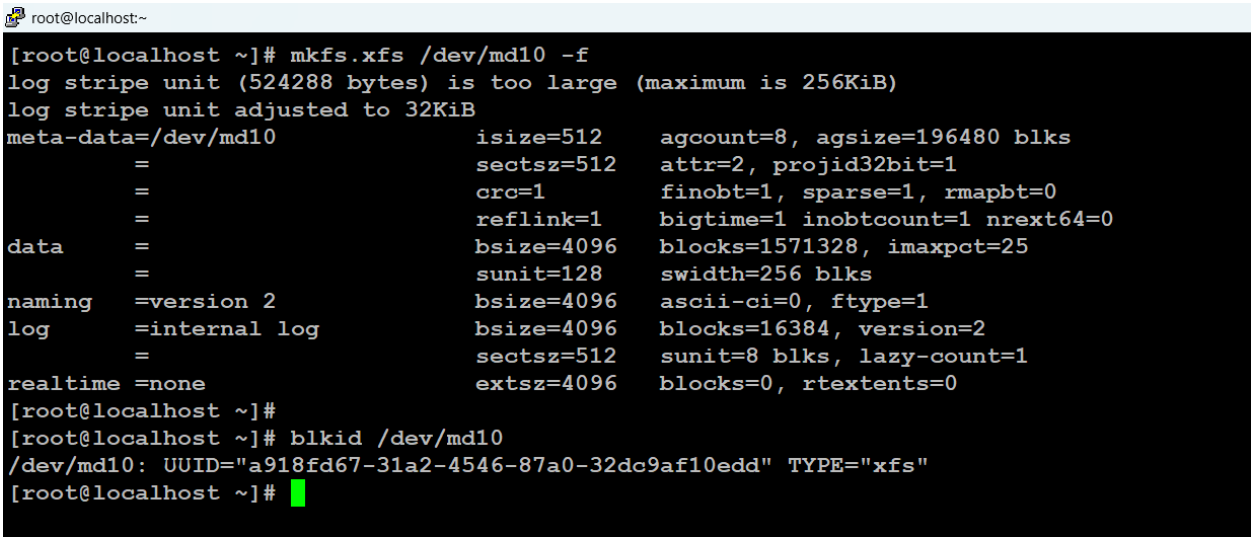




Step 4: Assign File System & Mount

Command:

mkfs.xfs /dev/md10



Commands:

mkdir /md10

mount /dev/md10 /md10

df -h /md10

root@localhost:~

```
[root@localhost ~]# mkdir /md10
[root@localhost ~]# mount /dev/md10 /md10
[root@localhost ~]# df -h /md10
Filesystem      Size  Used Avail Use% Mounted on
/dev/md10       6.0G   75M  5.9G   2% /md10
[root@localhost ~]#
```

Step 5: Persist the mount in /etc/fstab

Commands:

vi /etc/fstab

cat /etc/fstab | grep -i /md10

mount | grep /md10

root@localhost:~

```
[root@localhost ~]# vi /etc/fstab
[root@localhost ~]# cat /etc/fstab | grep -i /md10
UUID=a918fd67-31a2-4546-87a0-32dc9af10edd       /md10   xfs     defaults        0 0
[root@localhost ~]#
[root@localhost ~]#
```

root@localhost:~

```
[root@localhost ~]# lsblk /dev/sd{b,c,d,e}
NAME    MAJ:MIN RM SIZE RO TYPE   MOUNTPOINTS
sdb       8:16   0   3G  0 disk
└─md10    9:10   0   6G  0 raid10 /md10
sdc       8:32   0   3G  0 disk
└─md10    9:10   0   6G  0 raid10 /md10
sdd       8:48   0   3G  0 disk
└─md10    9:10   0   6G  0 raid10 /md10
sde       8:64   0   3G  0 disk
└─md10    9:10   0   6G  0 raid10 /md10
[root@localhost ~]#
```

Step 6: Save Confiduration

Command:

mdadm --detail --scan --verbose >> /etc/mdadm.conf

cat /etc/mdadm.conf

```
[root@localhost ~]# mdadm --detail --scan --verbose >> /etc/mdadm.conf
[root@localhost ~]# cat /etc/mdadm.conf
ARRAY /dev/md/localhost.localdomain:10 level=raid10 num-devices=4 metadata=1.2 UUID=be1c905a:172cd45a:0b10ecfc:7c0dc4a
3
   devices=/dev/sdb,/dev/sdc,/dev/sdd,/dev/sde
[root@localhost ~]#
```

Fail / Remove / Add Disk:

mdadm /dev/md10 --fail /dev/sdb

mdadm /dev/md10 --remove /dev/sdb

mdadm /dev/md10 --add /dev/sdb