

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**

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

Step 2: Create the RAID 0 Array using Mdadm

Command:

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

```
root@suresh:~  
[root@suresh ~]# mdadm --create /dev/md0 --level=0 --raid-devices=2 /dev/sdb /dev/sdc  
mdadm: Defaulting to version 1.2 metadata  
mdadm: array /dev/md0 started.  
[root@suresh ~]#
```

- **--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 ~]# mdadm --detail /dev/md0
/dev/md0:
    Version : 1.2
  Creation Time : Fri Jul 11 15:56:06 2025
    Raid Level : raid0
    Array Size : 6285312 (5.99 GiB 6.44 GB)
    Raid Devices : 2
    Total Devices : 2
    Persistence : Superblock is persistent

    Update Time : Fri Jul 11 15:56:06 2025
      State : clean
    Active Devices : 2
    Working Devices : 2
    Failed Devices : 0
    Spare Devices : 0


    Layout : original
    Chunk Size : 512K

Consistency Policy : none


    Name : suresh:0 (local to host suresh)
    UUID : 02111e1c:c99a1b8e:5f2d45a9:51dbbc3d
    Events : 0


   Number   Major   Minor   RaidDevice State
    -----
     0         8       16         0   active sync  /dev/sdb
     1         8       32         1   active sync  /dev/sdc
[root@suresh ~]#

```

```
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 nnext64=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**

```
root@suresh:~  
[root@suresh ~]# lsblk /dev/sdb /dev/sde  
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINTS  
sdb    8:16    0   3G  0 disk  
sde    8:64    0   3G  0 disk  
[root@suresh ~]#
```

Step 2: Create the RAID 1 Array using Mdadm

Command:

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

```
root@suresh:~# mdadm --create /dev/md1 --level=1 --raid-devices=2 /dev/sdd /dev/sde
mdadm: Note: this array has metadata at the start and
may not be suitable as a boot device. If you plan to
store '/boot' on this device please ensure that
your boot-loader understands md/v1.x metadata, or use
--metadata=0.90
Continue creating array [y/N]? y
mdadm: Defaulting to version 1.2 metadata
mdadm: array /dev/md1 started.
[root@suresh ~]#
```

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

root@suresh:~

```
[root@suresh ~]# vi /etc/fstab
[root@suresh ~]# cat /etc/fstab | grep -i /md1
UUID=487b9682-1f2f-42b7-a8c7-c570f81018af /md1 xfs defaults 0 0
[root@suresh ~]#
[root@suresh ~]# mount | grep /md1
/dev/md1 on /md1 type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
[root@suresh ~]#
```

root@suresh:~

```
[root@suresh ~]# lsblk /dev/sdd /dev/sde
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINTS
sdd 8:48 0 3G 0 disk
└─md1 9:1 0 3G 0 raid1 /md1
sde 8:64 0 3G 0 disk
└─md1 9:1 0 3G 0 raid1 /md1
[root@suresh ~]#
```

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'**

```
root@localhost:~  
[root@localhost ~]# lsblk | grep -E 'sdb|sdc|sdd'  
sdb      8:16    0     3G  0 disk  
sdc      8:32    0     3G  0 disk  
sdd      8:48    0     3G  0 disk  
[root@localhost ~]#
```

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**

```
root@localhost:~  
[root@localhost ~]# mdadm --create /dev/md5 --level=5 --raid-devices=3 /dev/sdb /dev/sdc /dev/sdd  
mdadm: Defaulting to version 1.2 metadata  
mdadm: array /dev/md5 started.  
[root@localhost ~]#
```

- **--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

```
root@localhost:~  
[root@localhost ~]# mkfs.xfs /dev/md5  
log stripe unit (524288 bytes) is too large (maximum is 256KiB)  
log stripe unit adjusted to 32KiB  
meta-data=/dev/md5      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 nnext64=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@localhost ~]#  
[root@localhost ~]# blkid /dev/md5  
/dev/md5: UUID="9cde95f5-5d51-45eb-805d-5e57beb34972" TYPE="xfs"  
[root@localhost ~]#
```

Commands:

mkdir /md5

mount /dev/md5 /md5

df -h /md5

```
root@localhost:~  
[root@localhost ~]# mkdir /md5  
[root@localhost ~]# mount /dev/md5 /md5  
[root@localhost ~]# df -h /md5  
Filesystem      Size  Used Avail Use% Mounted on  
/dev/md5        6.0G   75M   5.9G   2% /md5  
[root@localhost ~]#
```

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'**

```
root@localhost:/  
[root@localhost ~]# lsblk | grep -E 'sdb|sdc|sdd|sde'  
sdb      8:16    0    3G  0 disk  
sdc      8:32    0    3G  0 disk  
sdd      8:48    0    3G  0 disk  
sde      8:64    0    3G  0 disk  
[root@localhost ~]#
```

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**

```
root@localhost:~  
[root@localhost ~]# mdadm --create /dev/md10 --level=10 --raid-devices=4 /dev/sdb /dev/sdc /dev/sdd /dev/sde  
mdadm: Defaulting to version 1.2 metadata  
mdadm: array /dev/md10 started.  
[root@localhost ~]#
```

- **--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

```
root@localhost:~
[root@localhost ~]# mdadm --detail /dev/md10
/dev/md10:
    Version : 1.2
    Creation Time : Sat Jul 12 09:52:18 2025
    Raid Level : raid10
    Array Size : 6285312 (5.99 GiB 6.44 GB)
    Used Dev Size : 3142656 (3.00 GiB 3.22 GB)
    Raid Devices : 4
    Total Devices : 4
    Persistence : Superblock is persistent

    Update Time : Sat Jul 12 09:52:49 2025
    State : clean
    Active Devices : 4
    Working Devices : 4
    Failed Devices : 0
    Spare Devices : 0

    Layout : near=2
    Chunk Size : 512K

Consistency Policy : resync

    Name : localhost.localdomain:10 (local to host localhost.localdomain)
    UUID : be1c905a:172cd45a:0b10ecfc:7c0dc4a3
    Events : 17

    Number   Major   Minor   RaidDevice State
    0         8       16      0      active sync set-A /dev/sdb
    1         8       32      1      active sync set-B /dev/sdc
    2         8       48      2      active sync set-A /dev/sdd
    3         8       64      3      active sync set-B /dev/sde
[root@localhost ~]#
```

root@localhost:~

```
[root@localhost ~]# cat /proc/mdstat
Personalities : [raid6] [raid5] [raid4] [raid10]
md10 : active raid10 sde[3] sdd[2] sdc[1] sdb[0]
      6285312 blocks super 1.2 512K chunks 2 near-copies [4/4] [UUUU]

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

Step 4: Assign File System & Mount

Command:

mkfs.xfs /dev/md10

root@localhost:~

```
[root@localhost ~]# mkfs.xfs /dev/md10 -f
log stripe unit (524288 bytes) is too large (maximum is 256KiB)
log stripe unit adjusted to 32KiB
meta-data=/dev/md10          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 nnext64=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@localhost ~]#
[root@localhost ~]# blkid /dev/md10
/dev/md10: UUID="a918fd67-31a2-4546-87a0-32dc9af10edd" TYPE="xfs"
[root@localhost ~]#
```

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 Configuration

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