

mdadm

```
mdadm --create --verbose /dev/md0 --level=5 --raid-devices=5  
/dev/sd{b,c,d,e,f}
```

```
[root@net ~]# lsblk
```

NAME	MAJ:MIN	RM	SIZE	RO	TYPE	MOUNTPOINT
sda	8:0	0	10G	0	disk	
├─sda1	8:1	0	512M	0	part	/boot/efi
├─sda2	8:2	0	512M	0	part	/boot
├─sda3	8:3	0	9G	0	part	
│ └─centos-root	253:0	0	8G	0	lvm	/
│ └─centos-swap	253:1	0	1G	0	lvm	[SWAP]
sdb	8:16	0	2G	0	disk	
└─md0	9:0	0	8G	0	raid5	
sdc	8:32	0	2G	0	disk	
└─md0	9:0	0	8G	0	raid5	
sdd	8:48	0	2G	0	disk	
└─md0	9:0	0	8G	0	raid5	
sde	8:64	0	2G	0	disk	
└─md0	9:0	0	8G	0	raid5	
sdf	8:80	0	2G	0	disk	
└─md0	9:0	0	8G	0	raid5	
sr0	11:0	1	973M	0	rom	

```
mkfs.xfs /dev/md0
```

```
mkdir /backup
```

```
echo "/dev/md0      /backup    xfs      defaults    0      0" >> /etc/fstab
```

```
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
/dev/mapper/centos-root / xfs defaults 0 0
UUID=530ba401-4c43-4e81-93af-a1ef0457adb4 /boot xfs defaults 0 0
UUID=C8D8-B0A6 /boot/efi vfat umask=0077,shortname=winnt 0 0
/dev/mapper/centos-swap swap swap defaults 0 0
/dev/md0 /backup xfs defaults 0 0
```

```
cd /var/log
```

```
cp -r * /backup/
```

```
mdadm --query /dev/name-of-device
```

```
mdadm --detail /dev/md0 - подробная инфа
```

```
/etc/mdadm.conf
```

Удаление диска

mdadm /dev/md0 --fail /dev/sdf - помечаем, как битый диск

```
[root@net backup]# mdadm /dev/md0 --fail /dev/sdf
mdadm: set /dev/sdf faulty in /dev/md0
[root@net backup]# mdadm --detail /dev/md0
/dev/md0:
    Version : 1.2
  Creation Time : Wed May 26 19:07:19 2021
    Raid Level : raid5
    Array Size : 8376320 (7.99 GiB 8.58 GB)
  Used Dev Size : 2094080 (2045.00 MiB 2144.34 MB)
    Raid Devices : 5
  Total Devices : 5
 Persistence : Superblock is persistent

    Update Time : Wed May 26 20:38:27 2021
      State : clean, degraded
Active Devices : 4
Working Devices : 4
Failed Devices : 1
Spare Devices : 0

    Layout : left-symmetric
  Chunk Size : 512K

Consistency Policy : resync

    Name : net:0 (local to host net)
   UUID : 47c4dc6a:1fc3a000:b58cdc89:b510e169
  Events : 20

   Number  Major   Minor   RaidDevice State
    0         8       16           0  active sync  /dev/sdb
    1         8       32           1  active sync  /dev/sdc
    2         8       48           2  active sync  /dev/sdd
    3         8       64           3  active sync  /dev/sde
    -         0         0           4  removed
```

mdadm /dev/md0 --remove /dev/sdf - удаляем

```

[root@net backup]# mdadm /dev/md0 --remove /dev/sdf
mdadm: hot removed /dev/sdf from /dev/md0
[root@net backup]# mdadm --detail /dev/md0
/dev/md0:
    Version : 1.2
  Creation Time : Wed May 26 19:07:19 2021
    Raid Level : raid5
    Array Size : 8376320 (7.99 GiB 8.58 GB)
  Used Dev Size : 2094080 (2045.00 MiB 2144.34 MB)
    Raid Devices : 5
    Total Devices : 4
 Persistence : Superblock is persistent

    Update Time : Wed May 26 20:40:01 2021
      State : clean, degraded
    Active Devices : 4
    Working Devices : 4
    Failed Devices : 0
    Spare Devices : 0


    Layout : left-symmetric
    Chunk Size : 512K

Consistency Policy : resync

           Name : net:0 (local to host net)
          UUID : 47c4dc6a:1fc3a000:b58cdc89:b510e169
        Events : 21

   Number   Major   Minor   RaidDevice State
     0         8       16           0    active sync   /dev/sdb
     1         8       32           1    active sync   /dev/sdc
     2         8       48           2    active sync   /dev/sdd
     3         8       64           3    active sync   /dev/sde
     -         0         0           4    removed

```

Подключаем новый диск к VM. Ресканируем диски.

```

echo "- - -" > /sys/class/scsi_host/host0/scan
echo "- - -" > /sys/class/scsi_host/host1/scan
echo "- - -" > /sys/class/scsi_host/host2/scan

lsblk

```

```

NAME                MAJ:MIN RM  SIZE RO TYPE  MOUNTPOINT
sda                  8:0    0   10G  0 disk
├─sda1                8:1    0   512M  0 part  /boot/efi
├─sda2                8:2    0   512M  0 part  /boot
├─sda3                8:3    0     9G  0 part
│ └─centos-root       253:0    0     8G  0 lvm    /
└─centos-swap         253:1    0     1G  0 lvm    [SWAP]
sdb                  8:16    0     2G  0 disk
└─md0                 9:0    0     8G  0 raid5 /backup
sdc                  8:32    0     2G  0 disk
└─md0                 9:0    0     8G  0 raid5 /backup
sdd                  8:48    0     2G  0 disk
└─md0                 9:0    0     8G  0 raid5 /backup
sde                  8:64    0     2G  0 disk
└─md0                 9:0    0     8G  0 raid5 /backup
sdf                  8:80    0     2G  0 disk
sdg                  8:96    0     2G  0 disk

```

Добавляем диск в массив

```
mdadm /dev/md0 --add /dev/sdg
```

```
[root@net backup]# mdadm --detail /dev/md0
/dev/md0:
    Version : 1.2
  Creation Time : Wed May 26 19:07:19 2021
    Raid Level : raid5
    Array Size : 8376320 (7.99 GiB 8.58 GB)
  Used Dev Size : 2094080 (2045.00 MiB 2144.34 MB)
    Raid Devices : 5
  Total Devices : 5
 Persistence : Superblock is persistent

    Update Time : Wed May 26 20:59:04 2021
      State : clean
 Active Devices : 5
Working Devices : 5
 Failed Devices : 0
  Spare Devices : 0


    Layout : left-symmetric
  Chunk Size : 512K

Consistency Policy : resync

        Name : net:0 (local to host net)
        UUID : 47c4dc6a:1fc3a000:b58cdc89:b510e169
        Events : 40

   Number   Major   Minor   RaidDevice State
     0         8       16           0  active sync  /dev/sdb
     1         8       32           1  active sync  /dev/sdc
     2         8       48           2  active sync  /dev/sdd
     3         8       64           3  active sync  /dev/sde
     5         8       96           4  active sync  /dev/sdg
```

cat /proc/mdstat - проверить состояние всех дисков

```
[root@net backup]# cat /proc/mdstat
Personalities : [raid6] [raid5] [raid4]
md0 : active raid5 sdg[5] sde[3] sdd[2] sdc[1] sdb[0]
      8376320 blocks super 1.2 level 5, 512k chunk, algorithm 2 [5/5] [UUUUU]
```

mdadm /dev/md0 --add /dev/sdf - диск добавится как hot-spare

mdadm -G -n 6 - увеличиваем массив до 6 дисков

```
[root@net backup]# mdadm -G -n 6 /dev/md0
[root@net backup]# mdadm -D /dev/md0
/dev/md0:
```

```
Version : 1.2
Creation Time : Wed May 26 19:07:19 2021
Raid Level : raid5
Array Size : 10470400 (9.99 GiB 10.72 GB)
Used Dev Size : 2094080 (2045.00 MiB 2144.34 MB)
Raid Devices : 6
Total Devices : 6
Persistence : Superblock is persistent

Update Time : Wed May 26 21:25:23 2021
State : clean
Active Devices : 6
Working Devices : 6
Failed Devices : 0
Spare Devices : 0
```

```
Layout : left-symmetric
Chunk Size : 512K
```

```
Consistency Policy : resync
```

```
Name : net:0 (local to host net)
UUID : 47c4dc6a:1fc3a000:b58cdc89:b510e169
Events : 79
```

Number	Major	Minor	RaidDevice	State	
0	8	16	0	active sync	/dev/sdb
1	8	32	1	active sync	/dev/sdc
2	8	48	2	active sync	/dev/sdd
3	8	64	3	active sync	/dev/sde
5	8	96	4	active sync	/dev/sdg
6	8	80	5	active sync	/dev/sdf

```
[root@net backup]# lsblk -l
```

NAME	MAJ:MIN	RM	SIZE	RO	TYPE	MOUNTPOINT
sda	8:0	0	10G	0	disk	
sda1	8:1	0	512M	0	part	/boot/efi
sda2	8:2	0	512M	0	part	/boot
sda3	8:3	0	9G	0	part	
centos-root	253:0	0	8G	0	lvm	/
centos-swap	253:1	0	1G	0	lvm	[SWAP]
sdb	8:16	0	2G	0	disk	
md0	9:0	0	10G	0	raid5	/backup
sdc	8:32	0	2G	0	disk	
md0	9:0	0	10G	0	raid5	/backup
sdd	8:48	0	2G	0	disk	
md0	9:0	0	10G	0	raid5	/backup
sde	8:64	0	2G	0	disk	
md0	9:0	0	10G	0	raid5	/backup
sdf	8:80	0	2G	0	disk	
md0	9:0	0	10G	0	raid5	/backup
sdg	8:96	0	2G	0	disk	
md0	9:0	0	10G	0	raid5	/backup
sr0	11:0	1	973M	0	rom	

```
[root@net backup]# df -Th
```

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
devtmpfs	devtmpfs	898M	0	898M	0%	/dev
tmpfs	tmpfs	910M	0	910M	0%	/dev/shm
tmpfs	tmpfs	910M	9.6M	900M	2%	/run
tmpfs	tmpfs	910M	0	910M	0%	/sys/fs/cgroup
/dev/mapper/centos-root	xfs	8.0G	1.6G	6.5G	20%	/
/dev/sda2	xfs	509M	224M	286M	44%	/boot
/dev/sda1	vfat	512M	12M	501M	3%	/boot/efi
tmpfs	tmpfs	182M	0	182M	0%	/run/user/0
/dev/md0	xfs	8.0G	38M	8.0G	1%	/backup

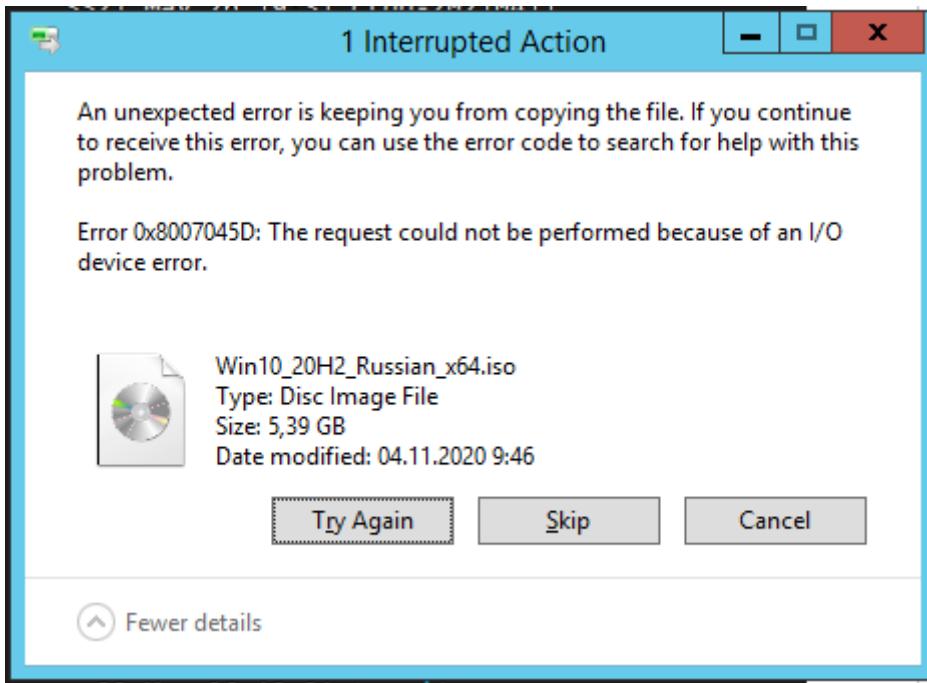
xfs_growfs /backup/ -d - увеличиваем размер FS

```
[root@net /]# df -Th
```

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
devtmpfs	devtmpfs	898M	0	898M	0%	/dev
tmpfs	tmpfs	910M	0	910M	0%	/dev/shm
tmpfs	tmpfs	910M	9.6M	900M	2%	/run
tmpfs	tmpfs	910M	0	910M	0%	/sys/fs/cgroup
/dev/mapper/centos-root	xfs	8.0G	1.6G	6.5G	20%	/
/dev/sda2	xfs	509M	224M	286M	44%	/boot
/dev/sda1	vfat	512M	12M	501M	3%	/boot/efi
tmpfs	tmpfs	182M	0	182M	0%	/run/user/0
/dev/md0	xfs	10G	39M	10G	1%	/backup

```
> /etc/mdadm.conf # создание конфига файла
mdadm --examine --scan --config=mdadm.conf >> /etc/mdadm.conf
или
mdadm --examine --brief --scan --config=partitions >> /etc/mdadm.conf
или
mdadm -Ebsc partitions
```

Легенда: Во время копирования с винды в папку NFS удалял по одному диски. Один удалил – норм. Второй удалил – нарушение.



```
cat /etc/mdstat
```

```
[root@net backup]# cat /proc/mdstat
Personalities : [raid6] [raid5] [raid4]
md0 : active raid5 sdg[7](F) sdb[0] sdf[6](F) sde[3] sdd[2] sdc[1]
      10470400 blocks super 1.2 level 5, 512k chunk, algorithm 2 [6/4] [UUUU__]
```

!!! Здесь добавляю диски обратно в WorkStation

```
mdadm /dev/md0 --remove /dev/sdg /dev/sdf
```

```
[root@net backup]# mdadm /dev/md0 --remove /dev/sdg /dev/sdf
mdadm: hot removed /dev/sdg from /dev/md0
mdadm: hot removed /dev/sdf from /dev/md0
```

```
mdadm /dev/md0 --add /dev/sdg /dev/sdf
```

```
mdadm: /dev/md0 has failed so using --add cannot work and might destroy
mdadm: data on /dev/sdg. You should stop the array and re-assemble it.
```

```
[root@net /]# mdadm --stop /dev/md0
mdadm: Cannot get exclusive access to /dev/md0:Perhaps a running process, mounted filesystem or active volume group?
```

```
umount: /backup: target is busy.
(In some cases useful info about processes that use
the device is found by lsof(8) or fuser(1))
```

- как с ЭТИМ

побороться не знаю, только ребут

После

```
[root@net ~]# mdadm -D /dev/md0
/dev/md0:
    Version : 1.2
    Raid Level : raid0
    Total Devices : 6
    Persistence : Superblock is persistent

    State : inactive
    Working Devices : 6

    Name : net:0 (local to host net)
    UUID : 47c4dc6a:1fc3a000:b58cdc89:b510e169
    Events : 123

    Number Major Minor RaidDevice
    -      -      -      -
    -      8       16     -      /dev/sdb
    -      8       32     -      /dev/sdc
    -      8       48     -      /dev/sdd
    -      8       64     -      /dev/sde
    -      8       80     -      /dev/sdf
    -      8       96     -      /dev/sdg
[root@net ~]#
```

```
mdadm --stop /dev/md0
```

```
mdadm: stopped /dev/md0
```

```
mdadm --assemble --scan --run -force
```

```
mdadm: /dev/md/0 has been started with 6 drives.
[root@net ~]# mdadm -D /dev/md0
/dev/md0:
    Version : 1.2
    Creation Time : Wed May 26 19:07:19 2021
    Raid Level : raid5
    Array Size : 10470400 (9.99 GiB 10.72 GB)
    Used Dev Size : 2094080 (2045.00 MiB 2144.34 MB)
    Raid Devices : 6
    Total Devices : 6
    Persistence : Superblock is persistent

    Update Time : Fri May 28 17:32:43 2021
    State : clean
    Active Devices : 6
    Working Devices : 6
    Failed Devices : 0
    Spare Devices : 0

    Layout : left-symmetric
    Chunk Size : 512K

Consistency Policy : resync

    Name : net:0 (local to host net)
    UUID : 47c4dc6a:1fc3a000:b58cdc89:b510e169
    Events : 123

    Number Major Minor RaidDevice State
    0       8       16      0     active sync  /dev/sdb
    1       8       32      1     active sync  /dev/sdc
    2       8       48      2     active sync  /dev/sdd
    3       8       64      3     active sync  /dev/sde
    7       8       96      4     active sync  /dev/sdg
    6       8       80      5     active sync  /dev/sdf
```



```
mdadm --assemble --force /dev/md0 /dev/sd[bcdefg] - так можно попробовать  
пересобирать
```

На скрипт у меня хватило фантазии только на это

```
#!/bin/bash
```

```
count_all=$(df -$1 | grep "/dev/sd." | awk '{s += $2} END {print s}')  
count_free=$(df -$1 | grep "/dev/sd." | awk '{s += $4} END {print s}')  
echo "Всего дисковой памяти, $1: $count_all"  
echo "Всего свободной памяти, $1: $count_free"
```